



ESHMC Modeling

Presented by Allan Wylie

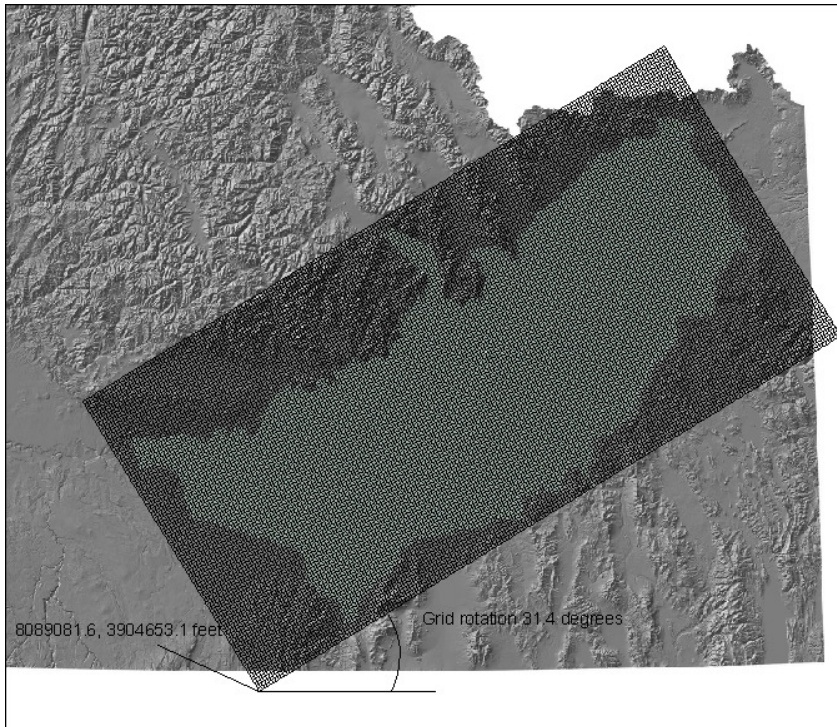
Date July 7-8, 2009



Outline

- Adjust the model boundary in the vicinity of Pocatello
 - Send to ESHMC for comment
 - Posted April 24, 2009
- Adjust Multi-drain file so there are no more than 3 drains per model cell
 - Upper, middle, lower
- Experiment with other solvers to get Multi-drain model to work

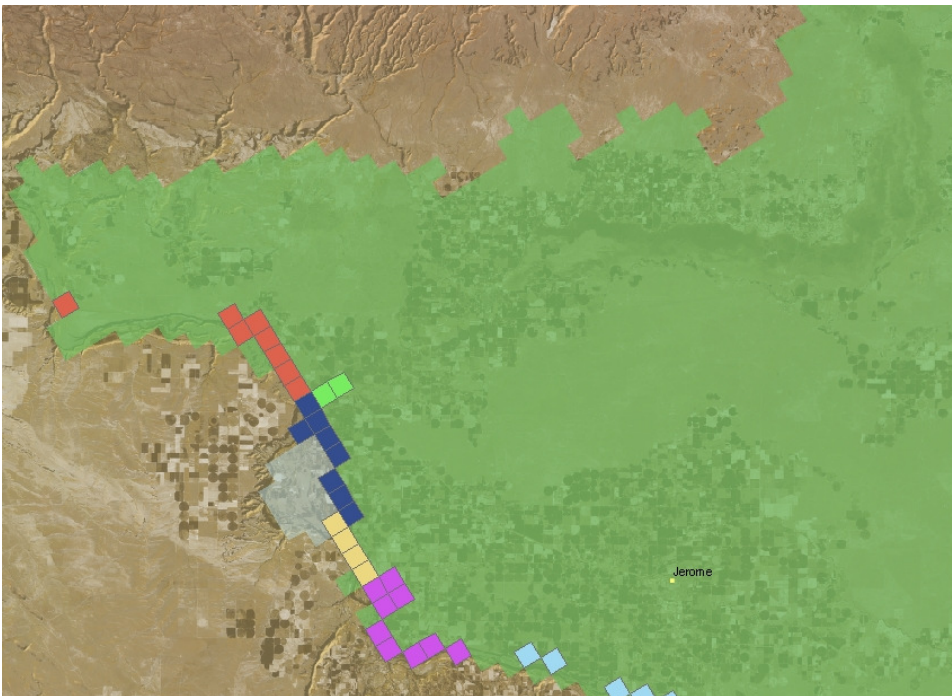
Model Boundary



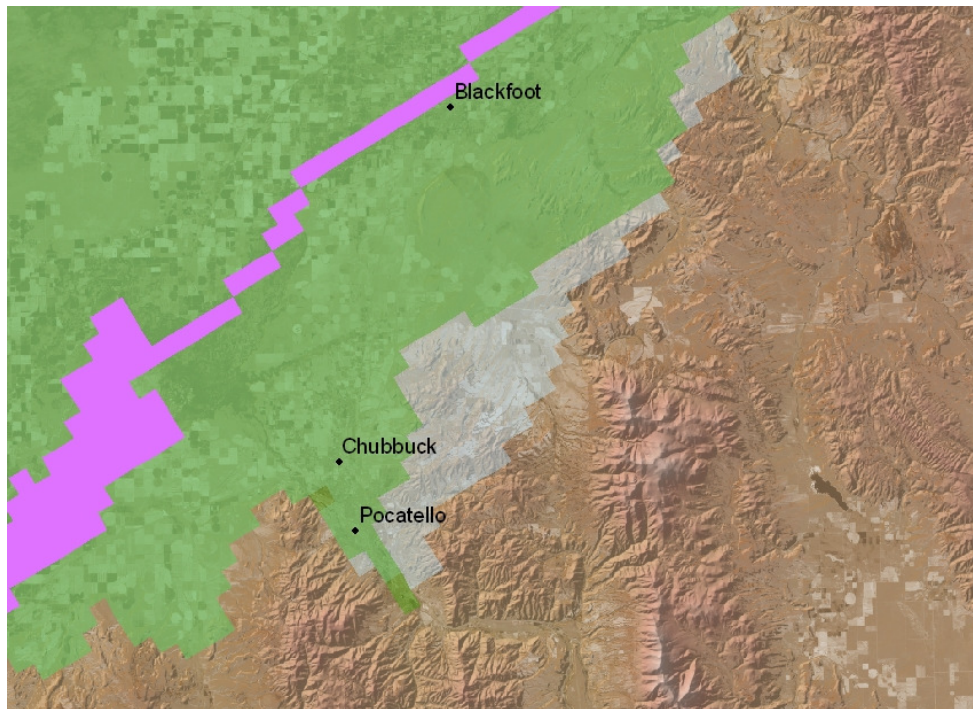
- Document
 - [AquiferBound Rev2.pdf](#)
- Model Grid updated
 - IDTM83
- Model Boundary
 - Remove cells below rim
 - Remove cells in foothills

Model Boundary

- Below Rim in Magic Valley
 - Ralston (2008)



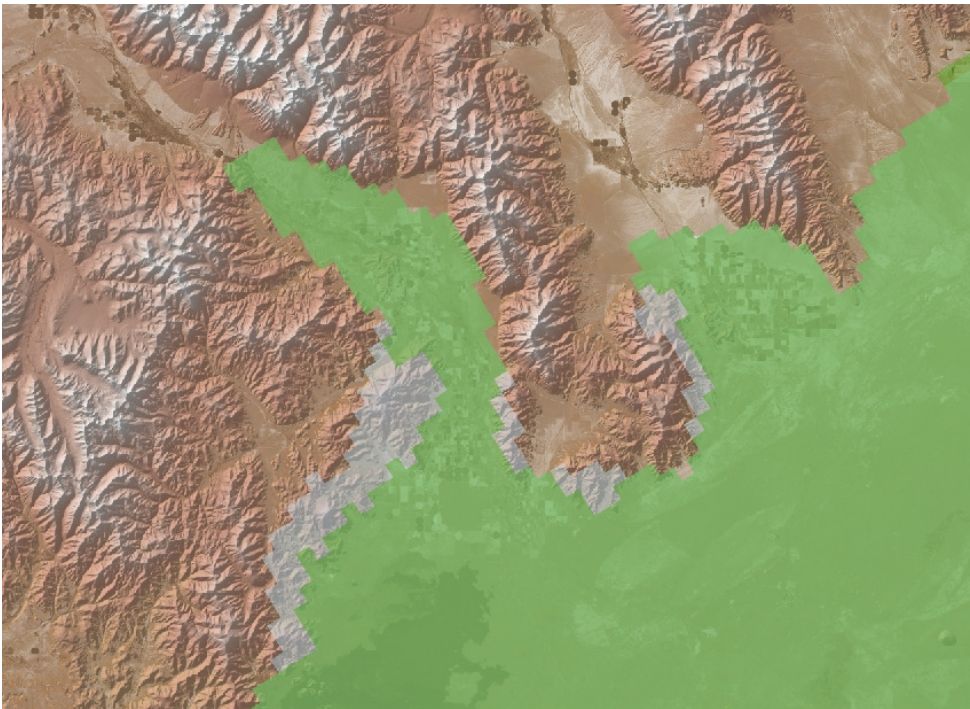
Model Boundary

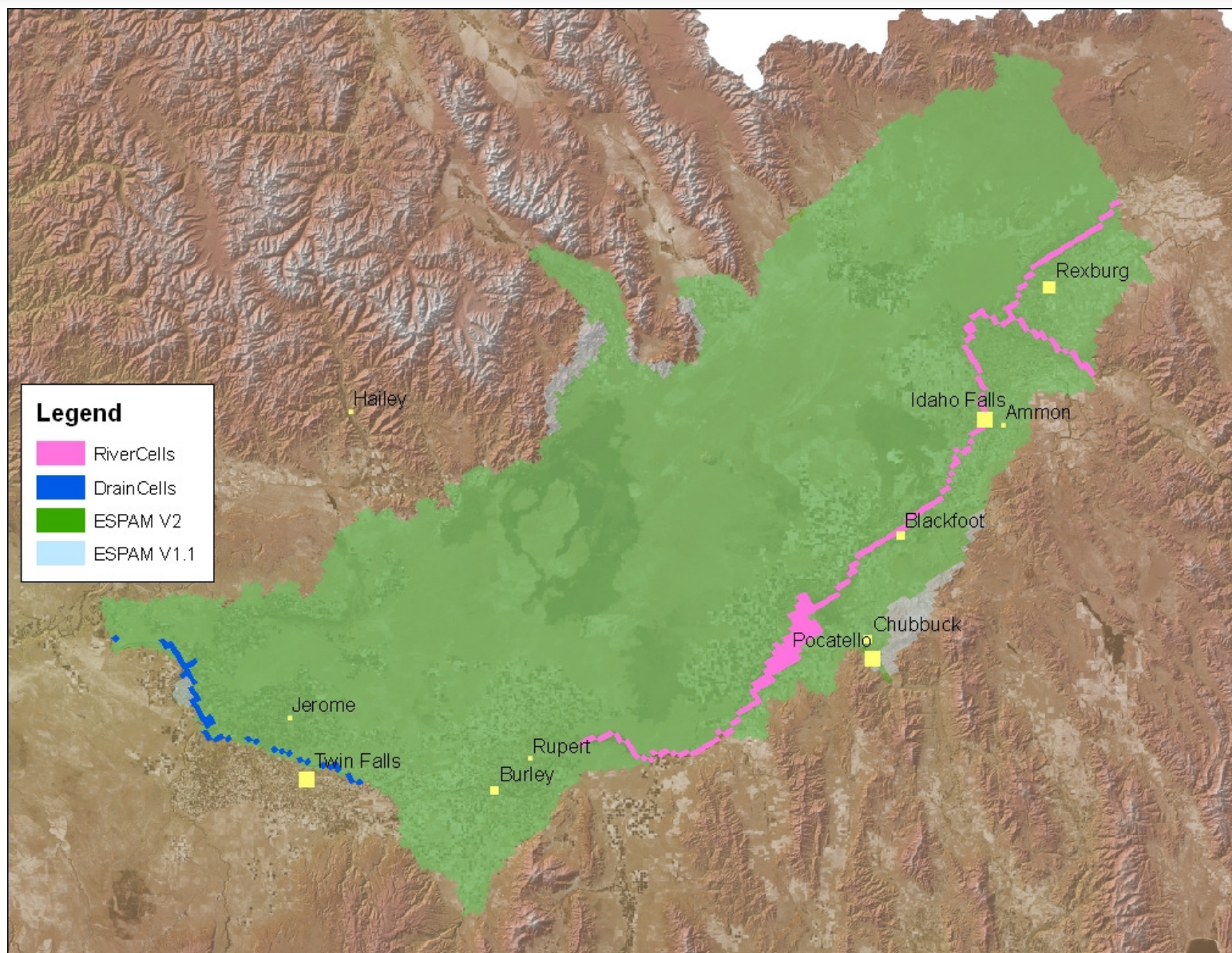


- Pocatello Area
 - Extend active cells to near 'gap'
 - Add cell to northwest of I86
 - Remove cells overlying foothills

Model Boundary

- Big and Little Lost changes
 - Remove cells overlying foothills



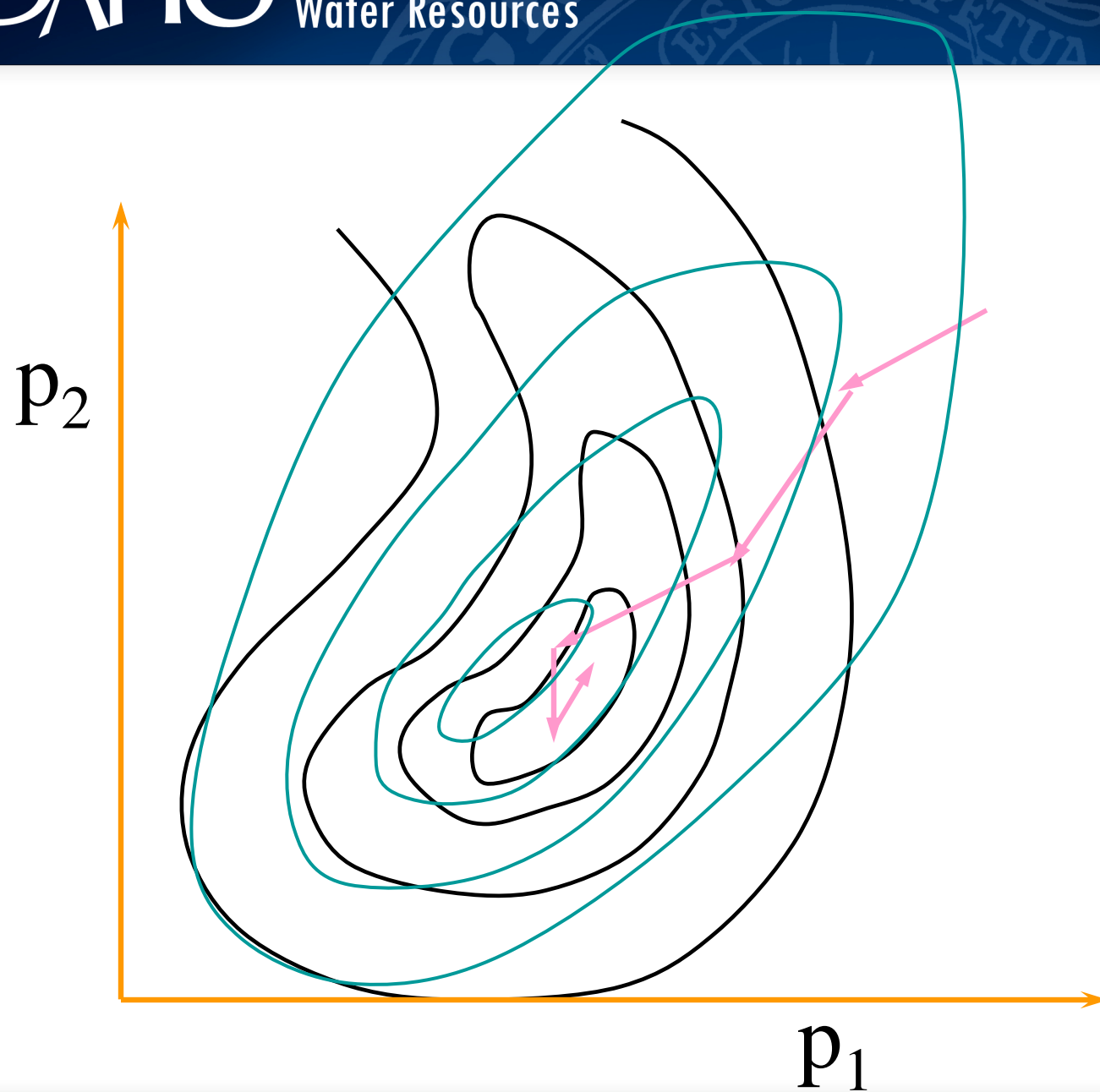


Multi-drain

- Last meeting after implementing our multi-drain plan we found we had 315 drains and we felt that introduced to many parameters
 - ESHMC suggested solution - set a maximum of 3 drains per model cell
 - High, middle, and low springs in each cell with springs at multiple elevations
- Results in 217 drains
 - EXCEL spreadsheet in ESHMC Meetings >2009 ESHMC >7-8&9-2009 >multidrain

Solver Issues

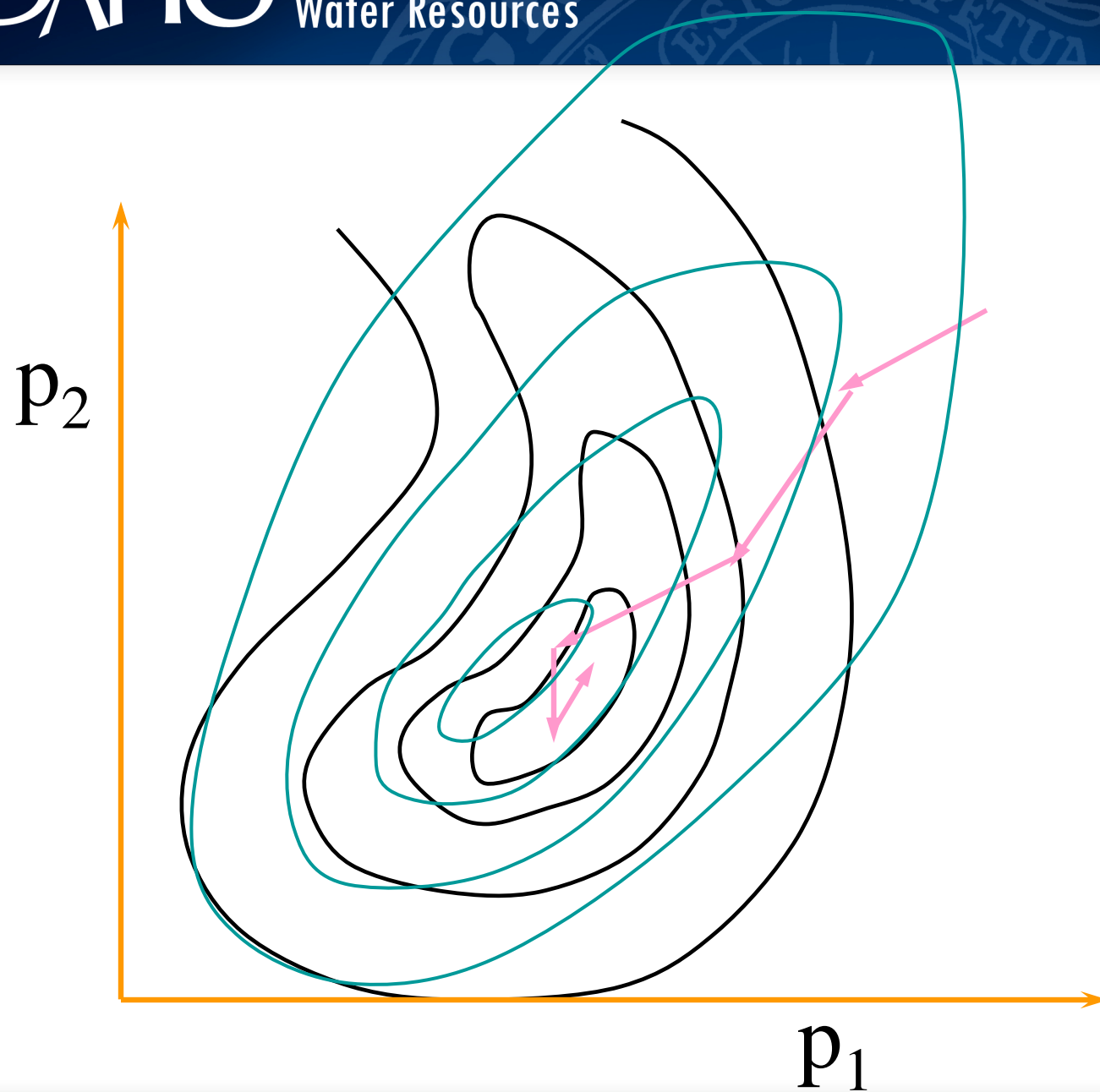
- Last meeting we had issues with calibration runs failing because the MODFLOW would occasionally fail to converge
- Suggested solutions included trying other solvers (i.e. pcg and adjusting the relaxation parameter)
- Result after numerous attempts I failed to find one solution that would work consistently
 - I incorporated an algorithm in the batch file running the model



Jacobian matrix:-

$\partial o_1 / \partial p_1$	$\partial o_1 / \partial p_2$	$\partial o_1 / \partial p_3$	$\partial o_1 / \partial p_4$
$\partial o_2 / \partial p_1$	$\partial o_2 / \partial p_2$	$\partial o_2 / \partial p_3$	$\partial o_2 / \partial p_4$
$\partial o_3 / \partial p_1$	$\partial o_3 / \partial p_2$	$\partial o_3 / \partial p_3$	$\partial o_3 / \partial p_4$
$\partial o_4 / \partial p_1$	$\partial o_4 / \partial p_2$	$\partial o_4 / \partial p_3$	$\partial o_4 / \partial p_4$
$\partial o_5 / \partial p_1$	$\partial o_5 / \partial p_2$	$\partial o_5 / \partial p_3$	$\partial o_5 / \partial p_4$
$\partial o_6 / \partial p_1$	$\partial o_6 / \partial p_2$	$\partial o_6 / \partial p_3$	$\partial o_6 / \partial p_4$
$\partial o_7 / \partial p_1$	$\partial o_7 / \partial p_2$	$\partial o_7 / \partial p_3$	$\partial o_7 / \partial p_4$
$\partial o_8 / \partial p_1$	$\partial o_8 / \partial p_2$	$\partial o_8 / \partial p_3$	$\partial o_8 / \partial p_4$

etc



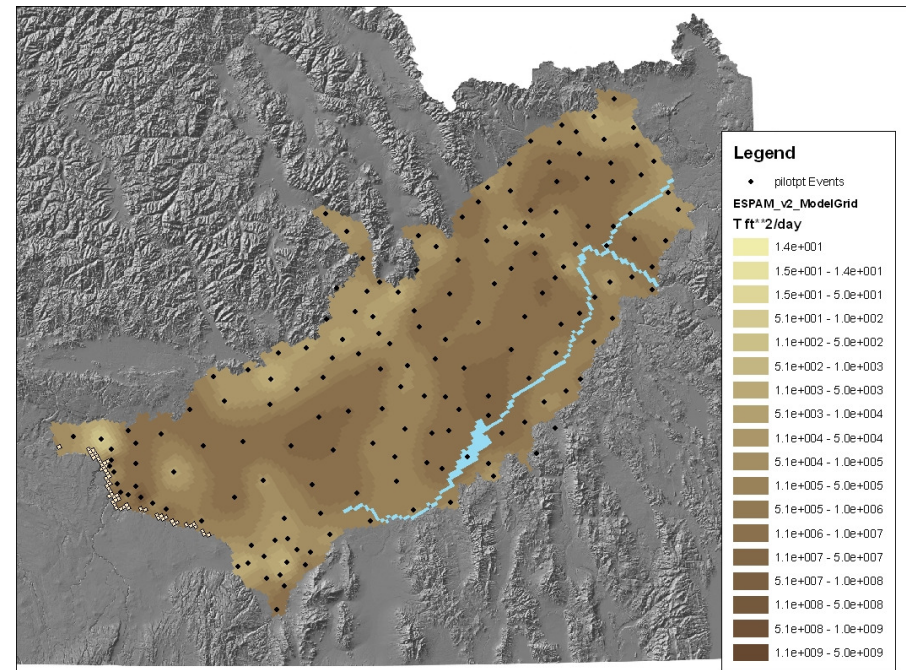
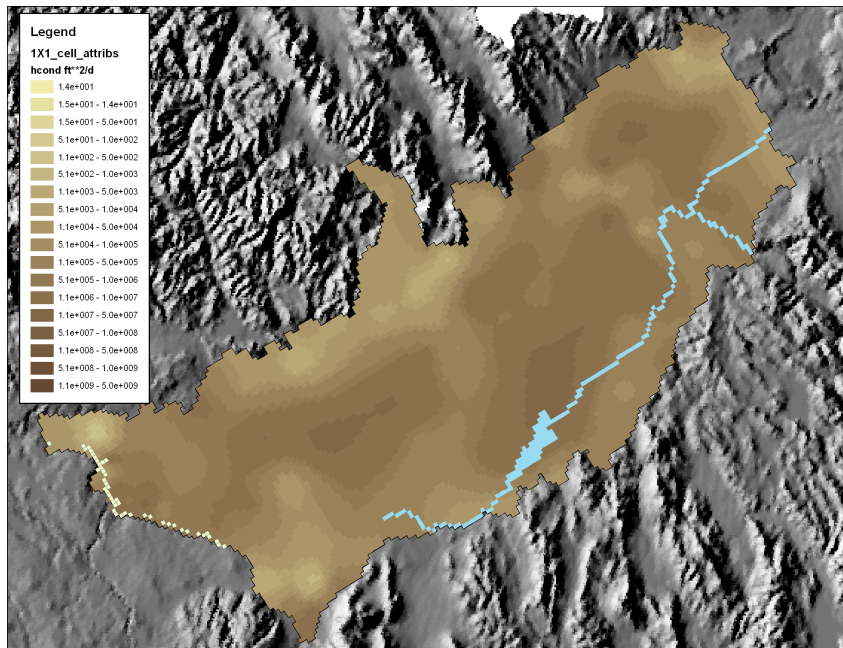
31 lines of batch file prior to transient run.

```
rem run transient model
del e_flag.txt          < delete file e_flag.txt
mf2k17 <bigtran1        < run MODFLOW with lng solver
ChkLst <ChkLst.in       < CHKLST reads a MODFLOW list file looking to see if MODFLOW converged
if exist e_flag.txt goto end < if MODFLOW converged this file will be created and batch file will skip to END
mf2k17 <bigtran2        < run MODFLOW with pcg solver
ChkLst <ChkLst.in       < CHKLST reads a MODFLOW list file looking to see if MODFLOW converged
if exist e_flag.txt goto end < if MODFLOW converged this file will be created and batch file will skip to END
mf2k17 <bigtran3        < run MODFLOW with pcg solver with relaxed convergence criterion
:END
```

24 lines of batch file follow this.

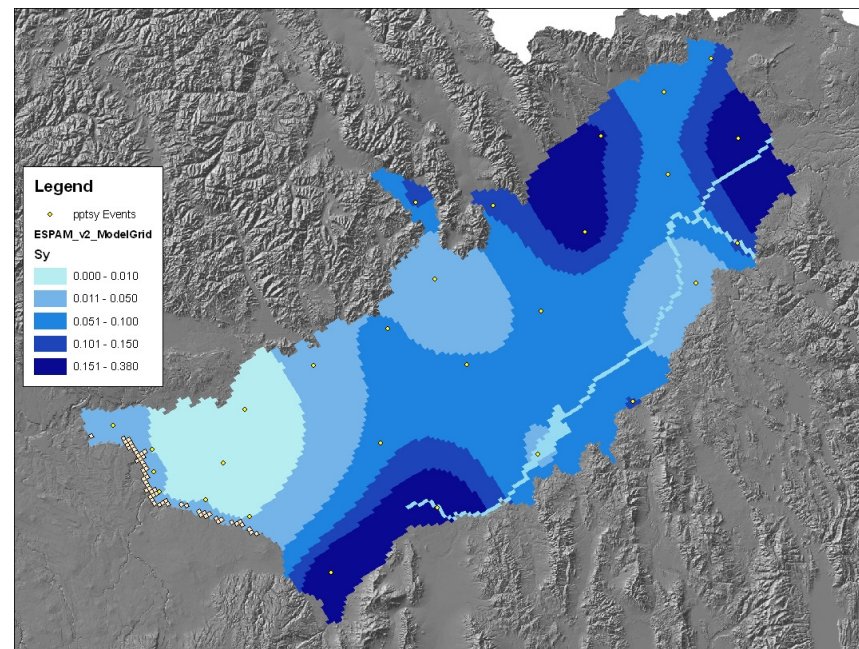
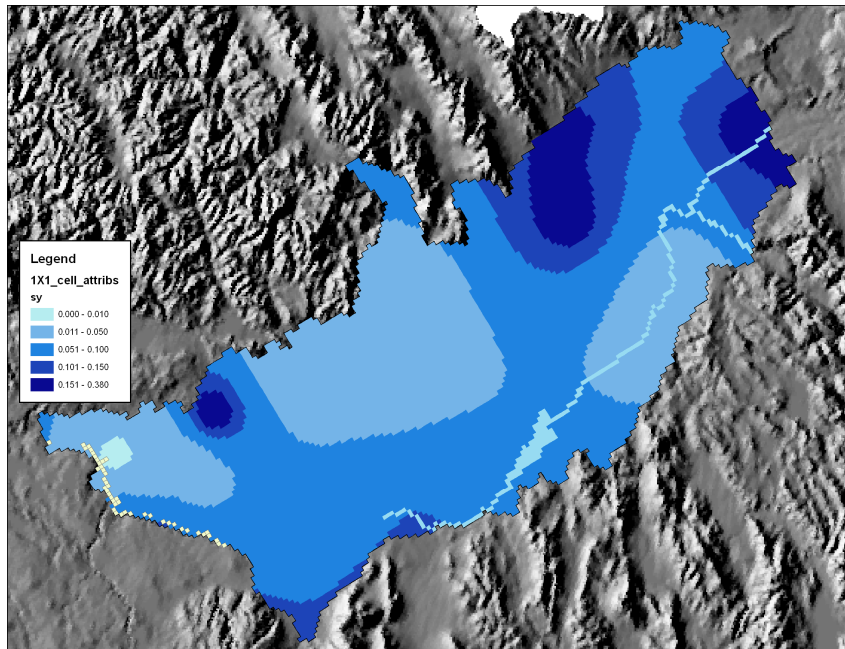
New Bound, Multi-drain 3, Solver fix

V 1.1



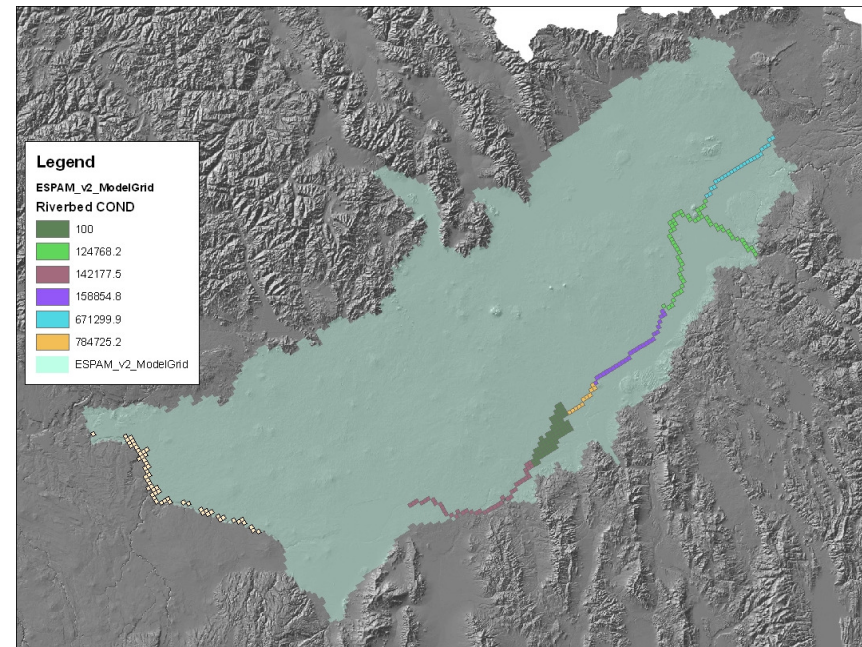
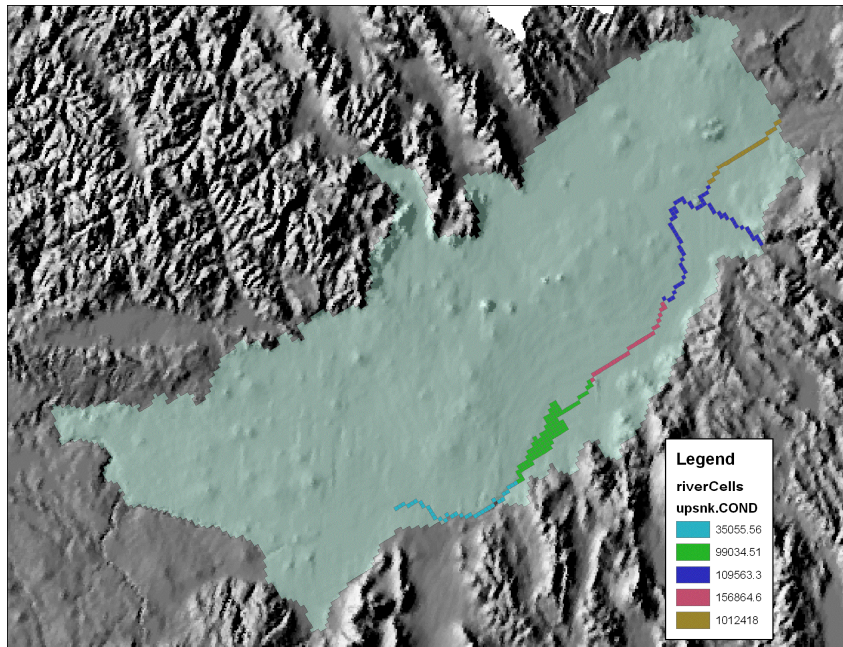
New Bound, Multi-drain 3, Solver fix

V 1.1



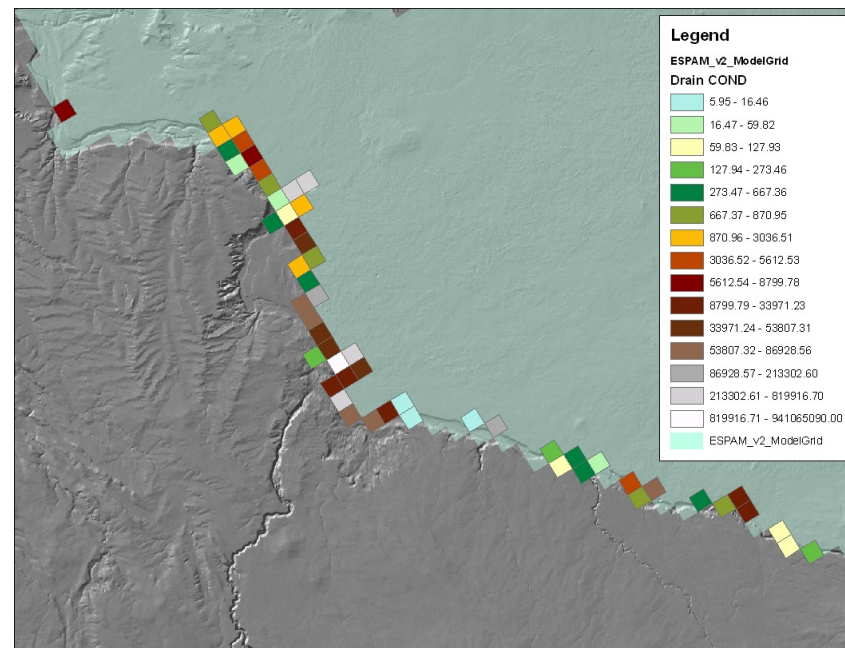
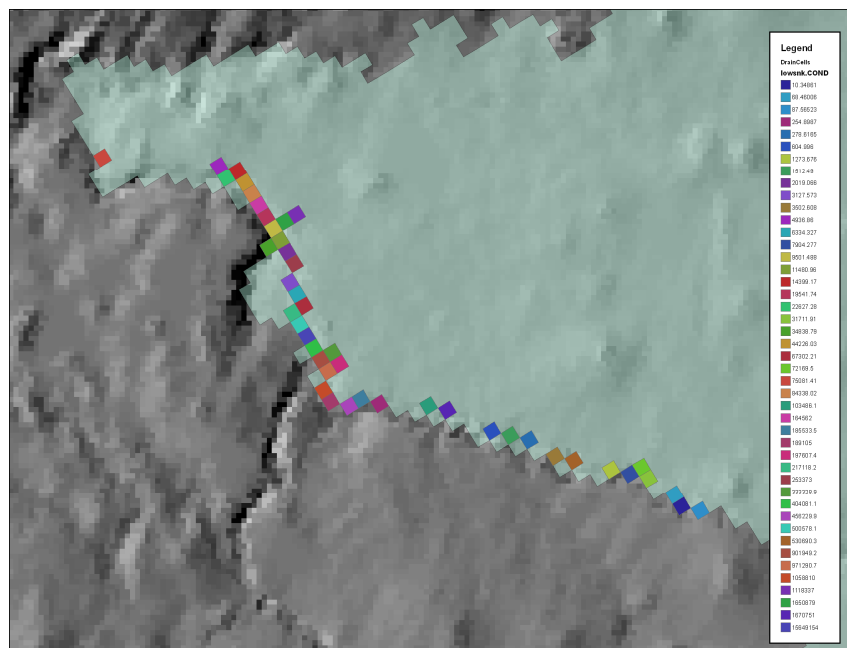
New Bound, Multi-drain 3, Solver fix

V 1.1

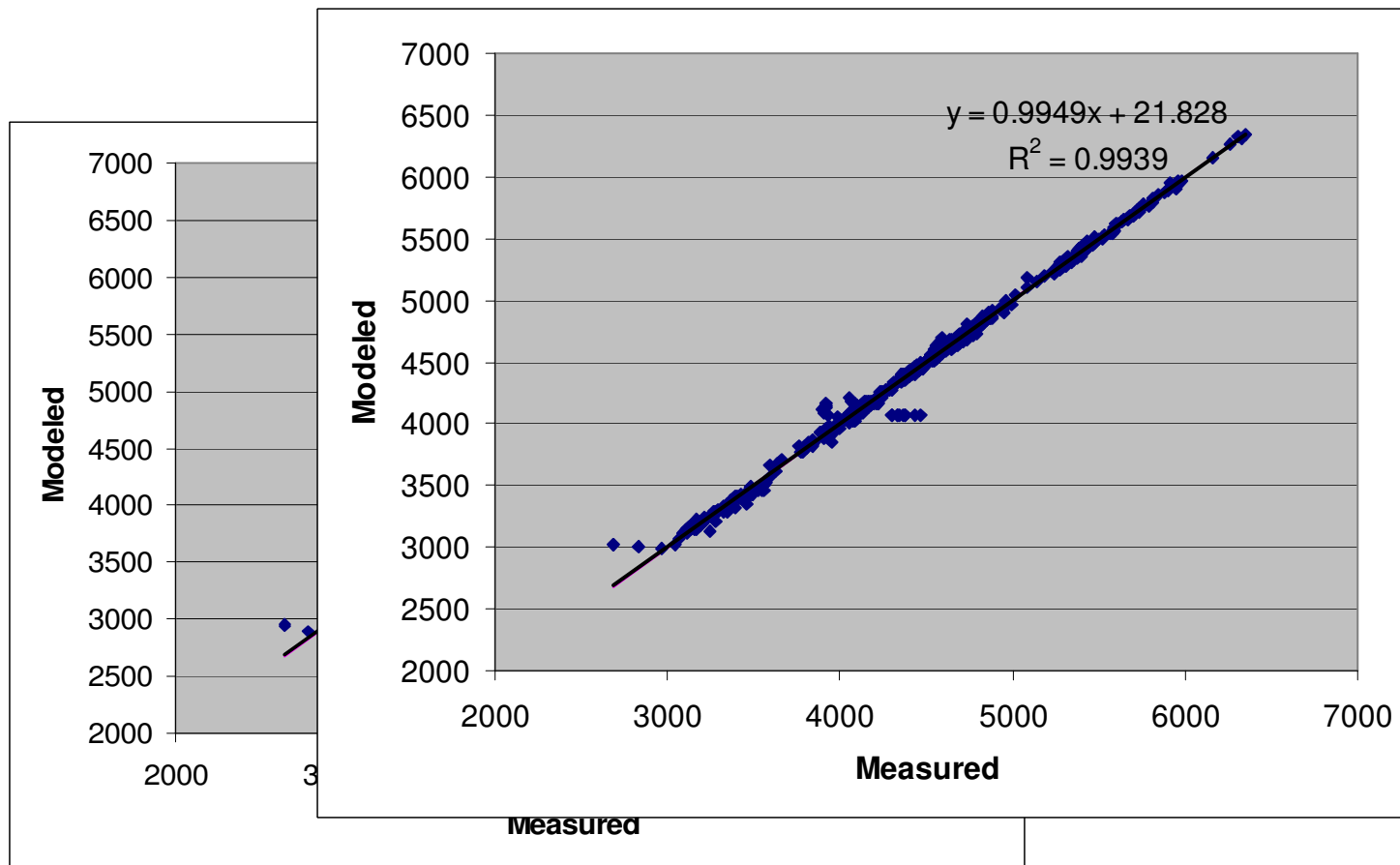


New Bound, Multi-drain 3, Solver fix

V 1.1

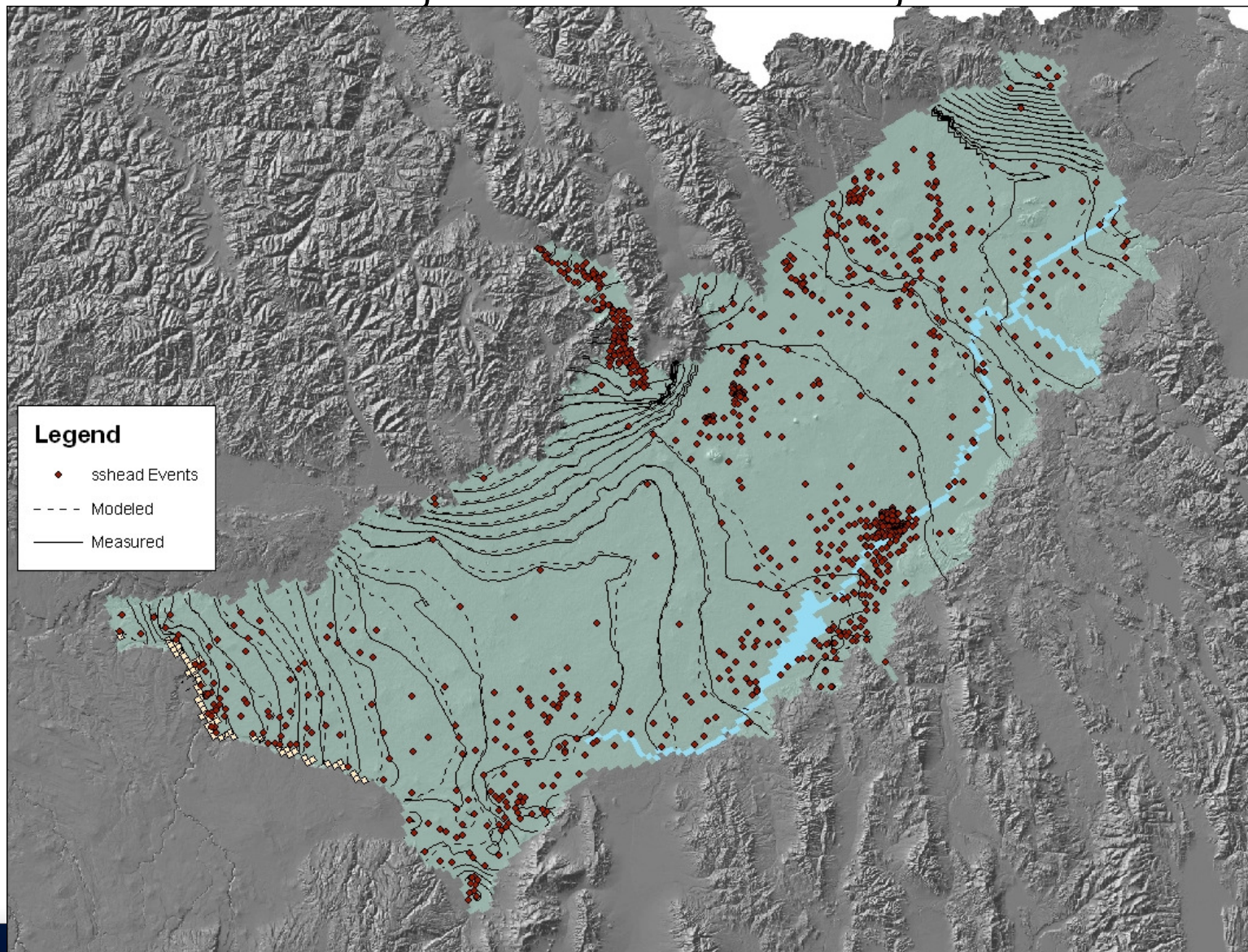


New Bound, Multi-drain 3, Solver fix

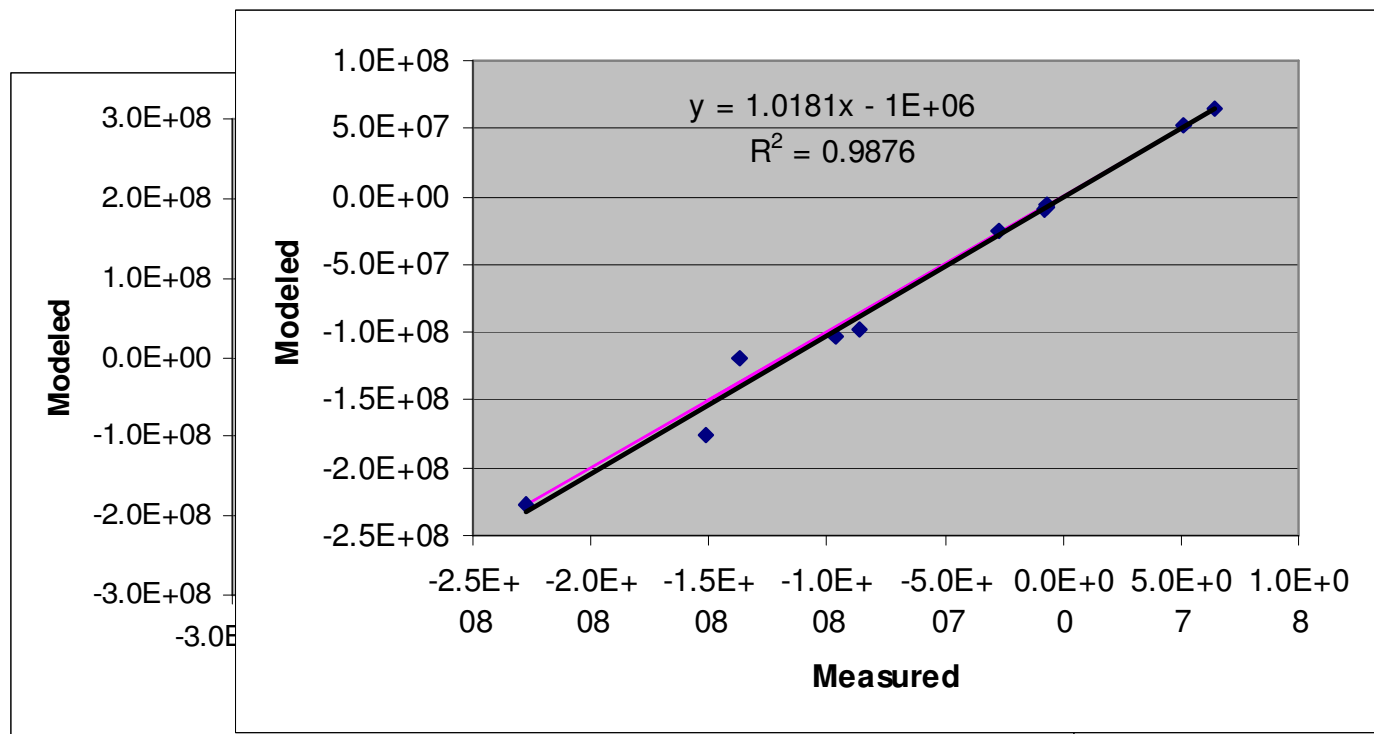


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 $x + 0$
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New Bound, Multi-drain 3, Solver fix



New Bound, Multi-drain 3, Solver fix



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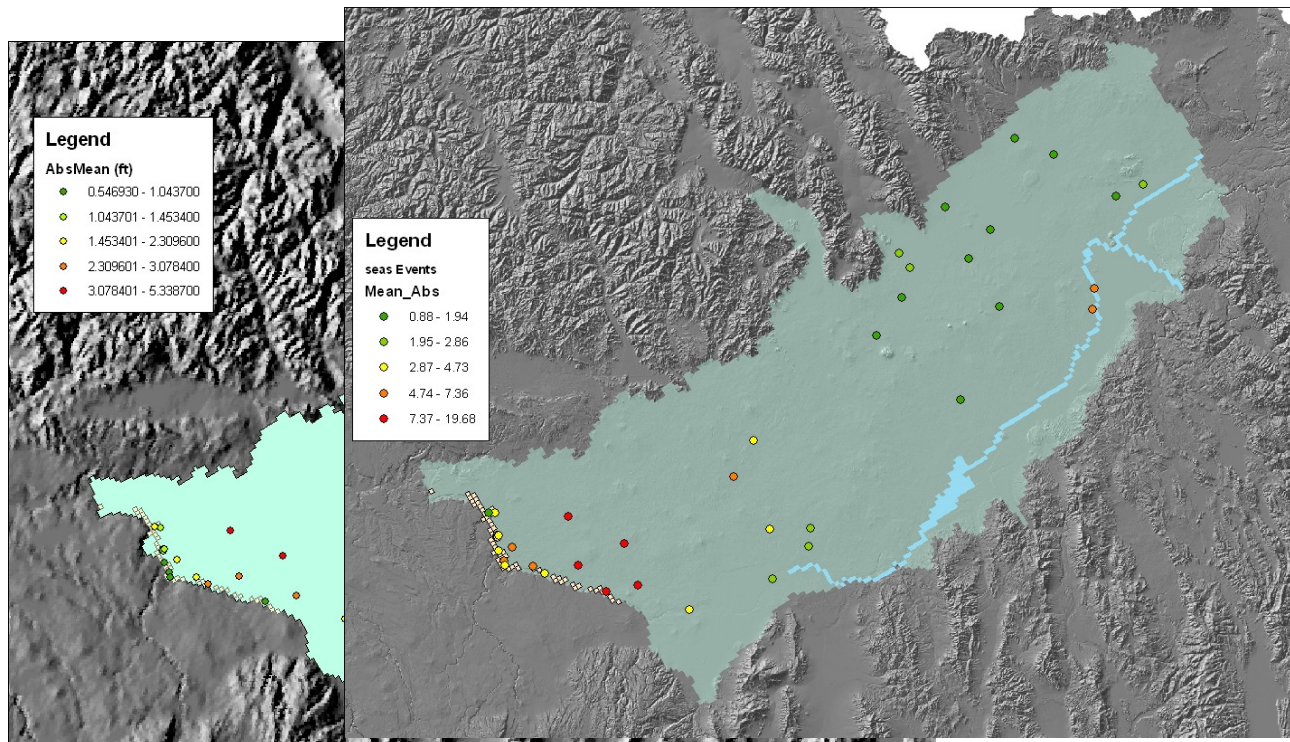
nk line is 45°

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perfect match

$Y=1x + 0$

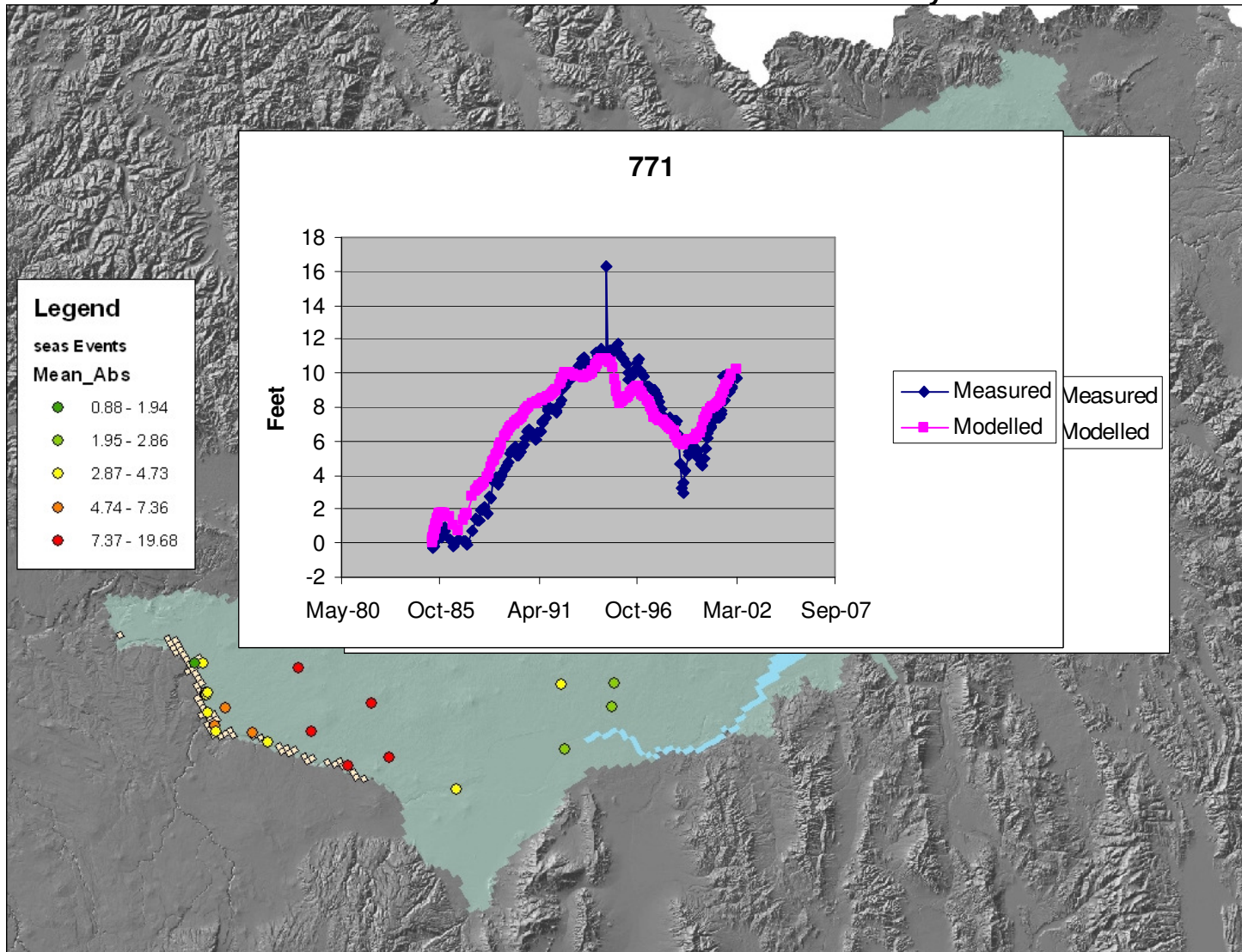
$R^2 = 1$

New Bound, Multi-drain 3, Solver fix

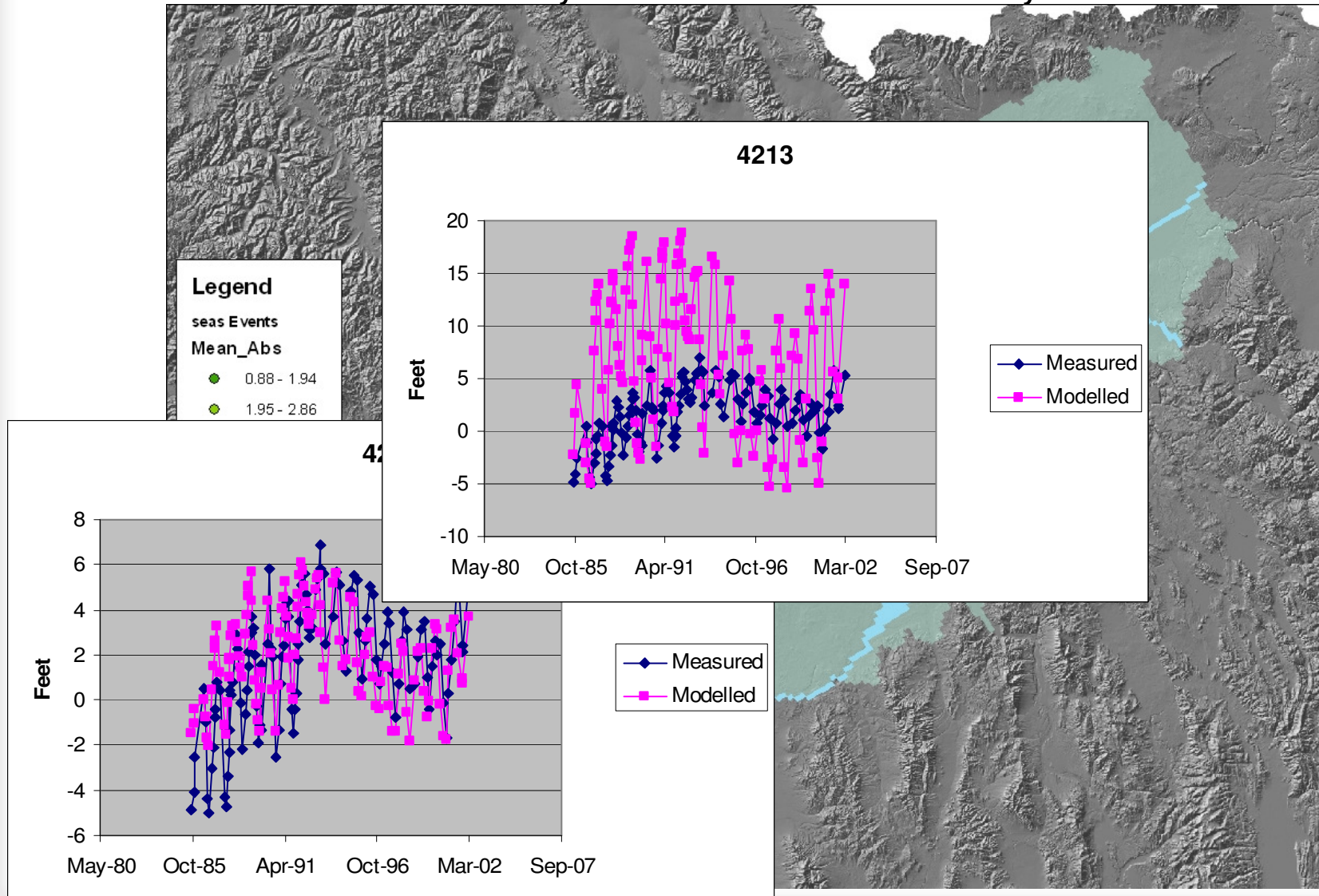


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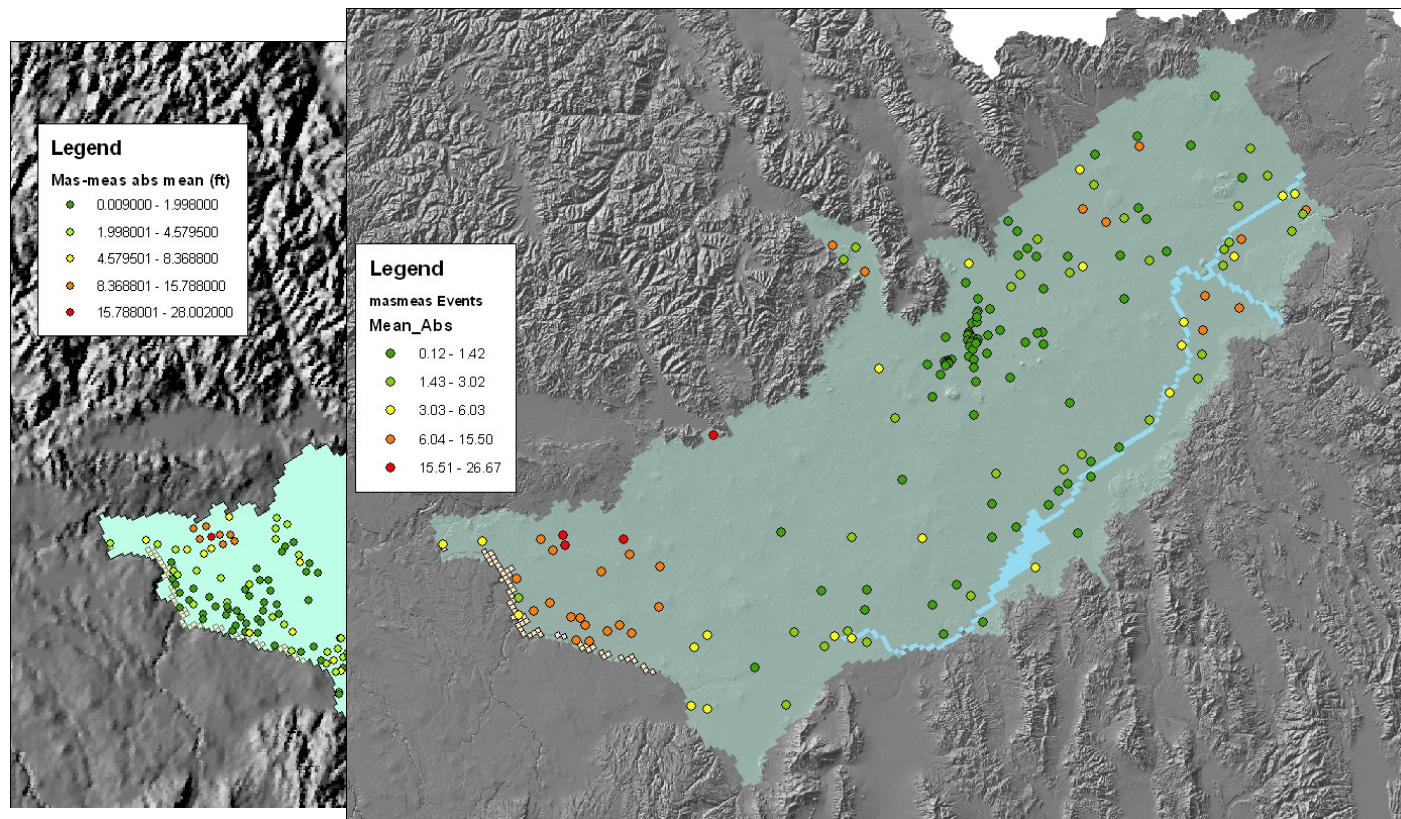
New Bound, Multi-drain 3, Solver fix



New Bound, Multi-drain 3, Solver fix



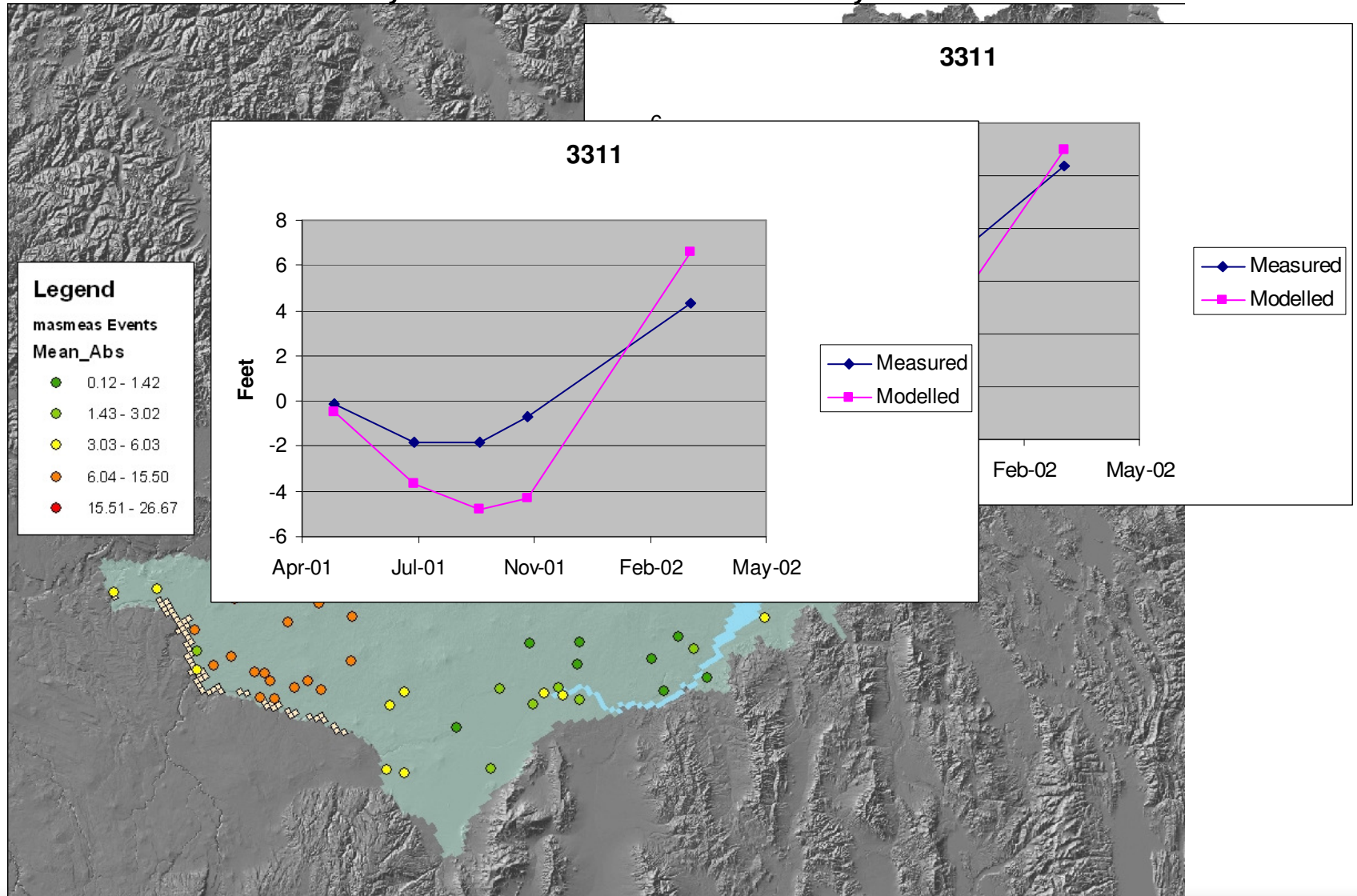
New Bound, Multi-drain 3, Solver fix



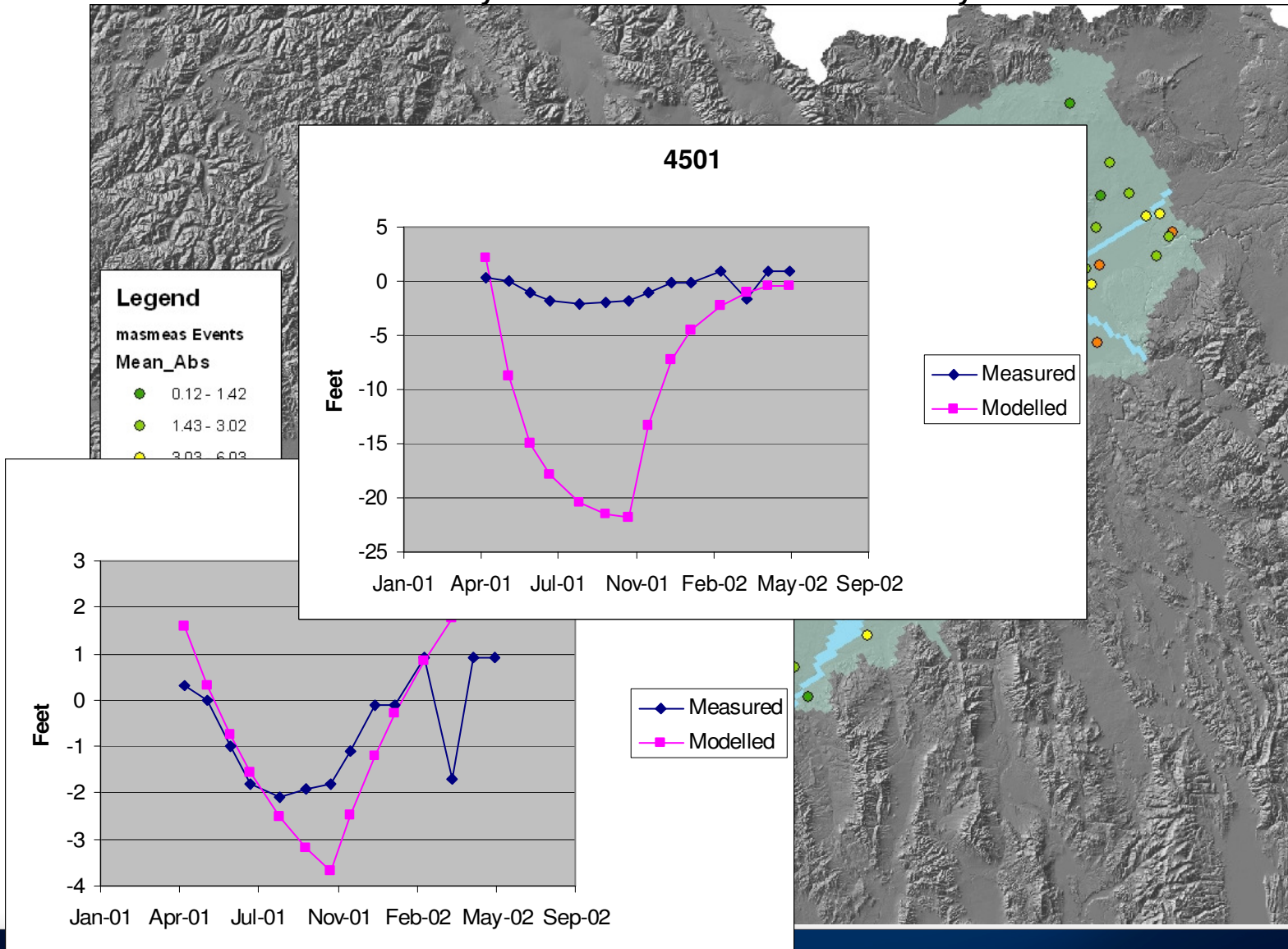
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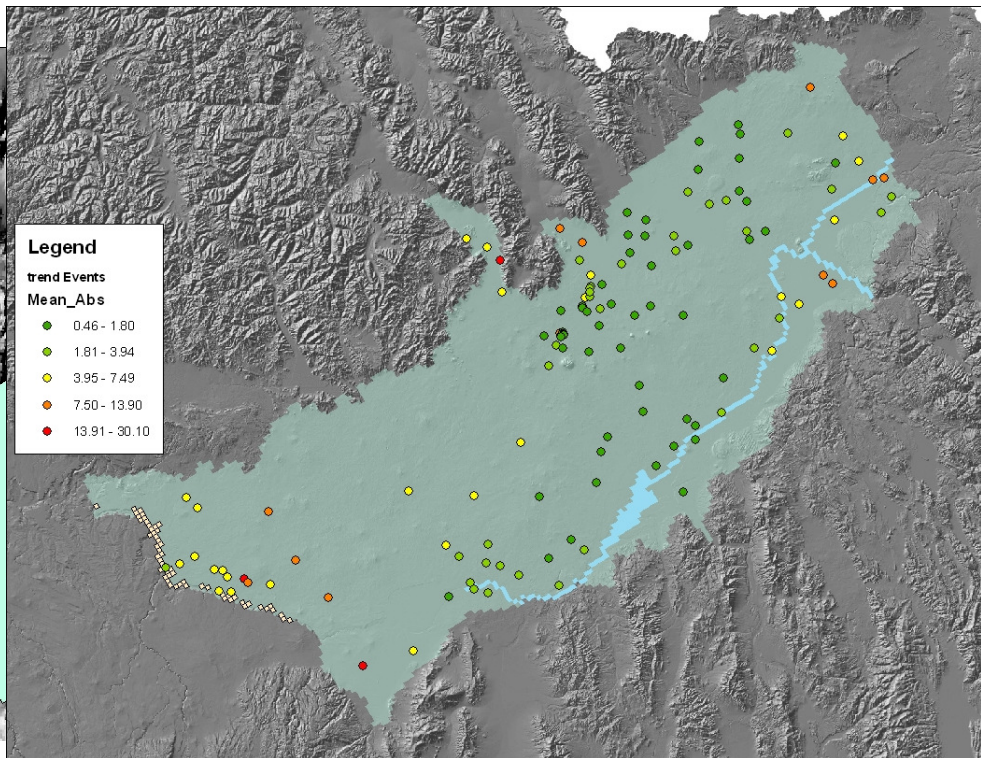
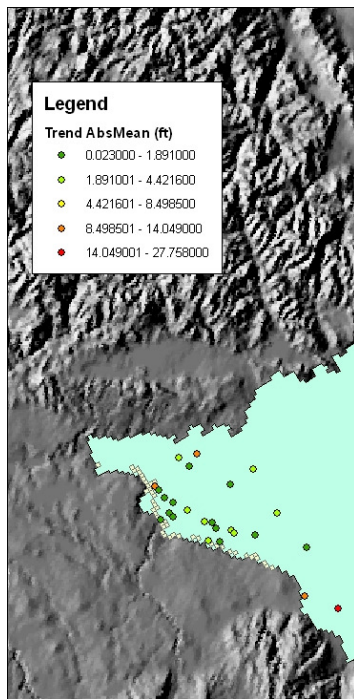
New Bound, Multi-drain 3, Solver fix



New Bound, Multi-drain 3, Solver fix

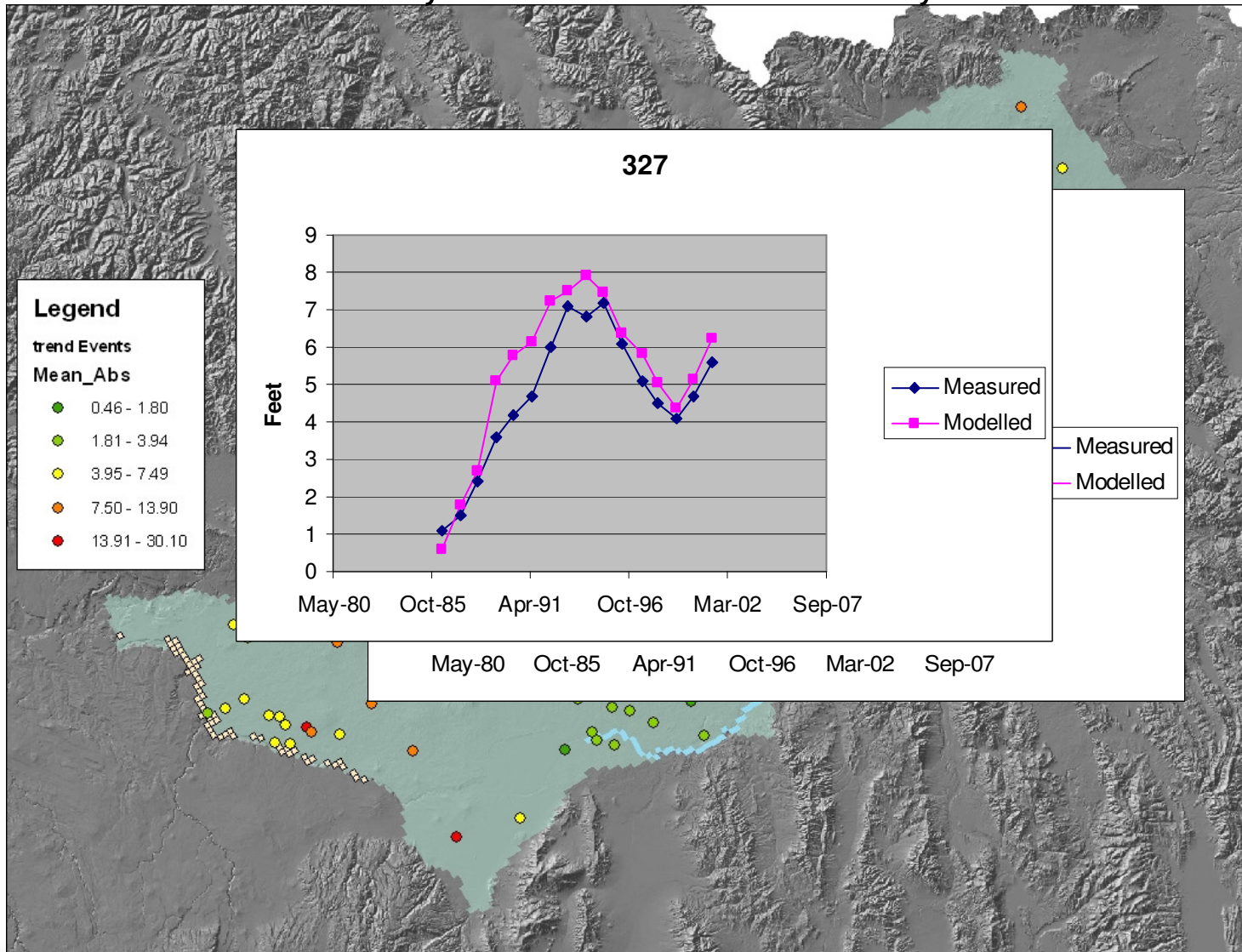


New Bound, Multi-drain 3, Solver fix

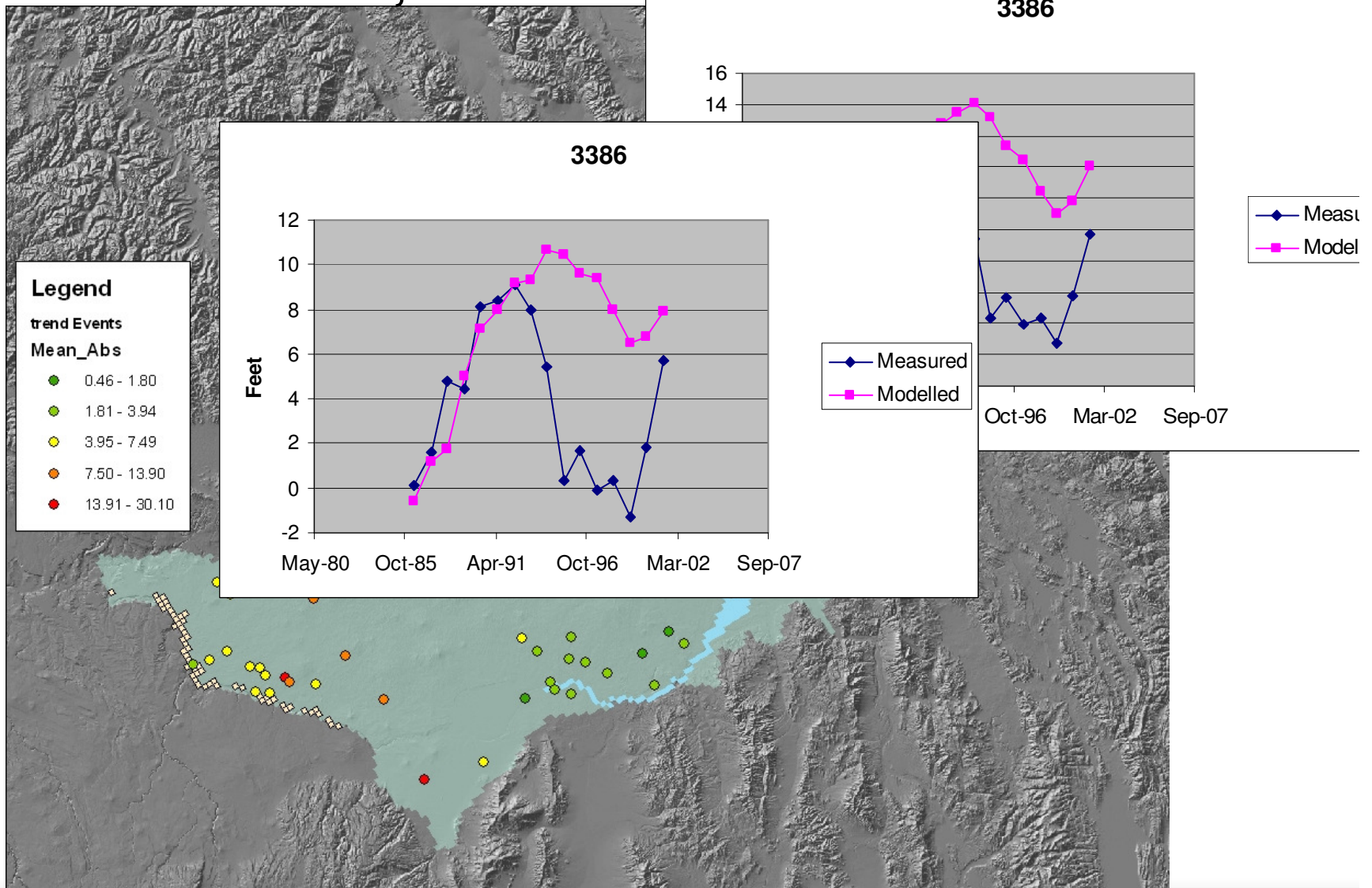


observations

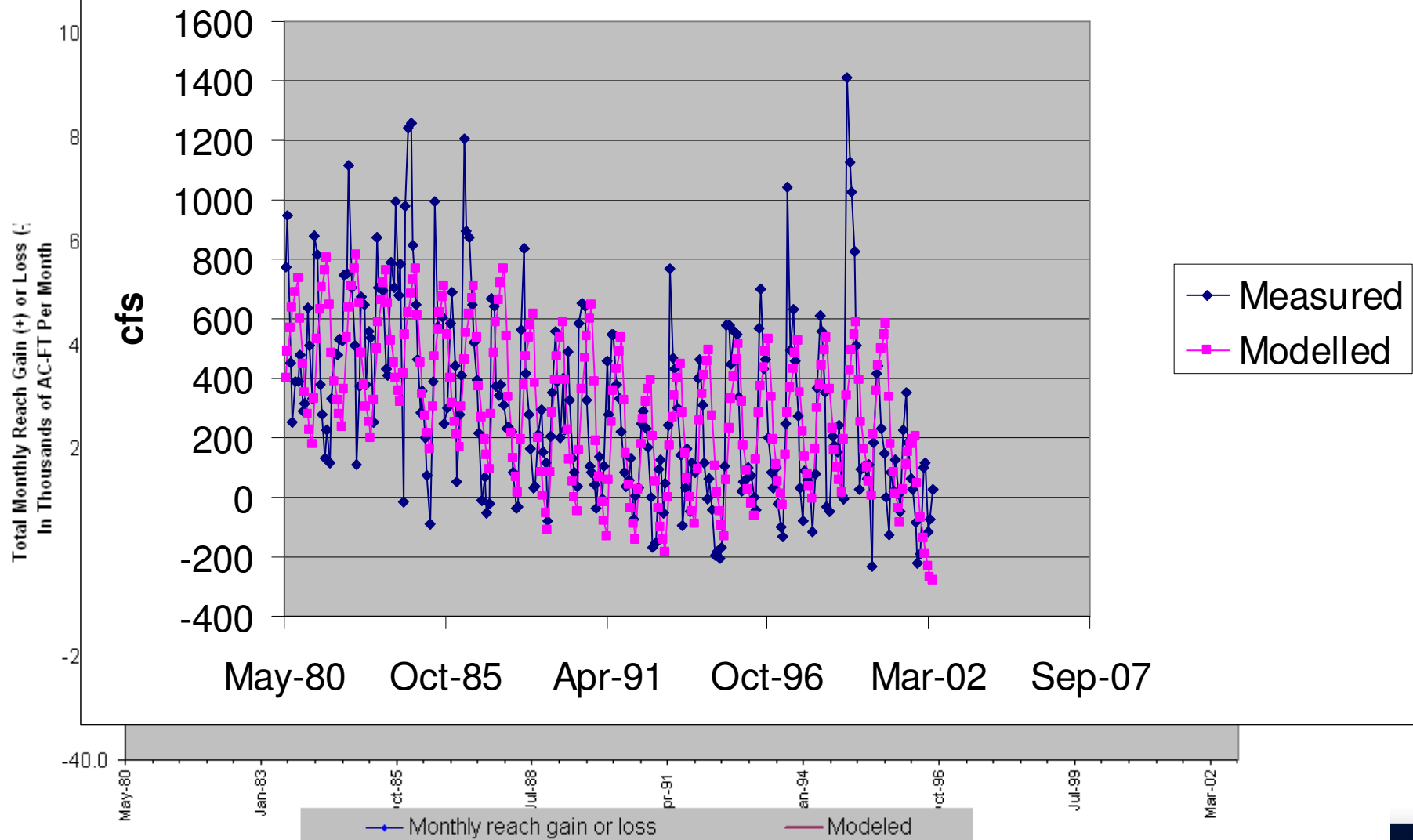
New Bound, Multi-drain 3, Solver fix



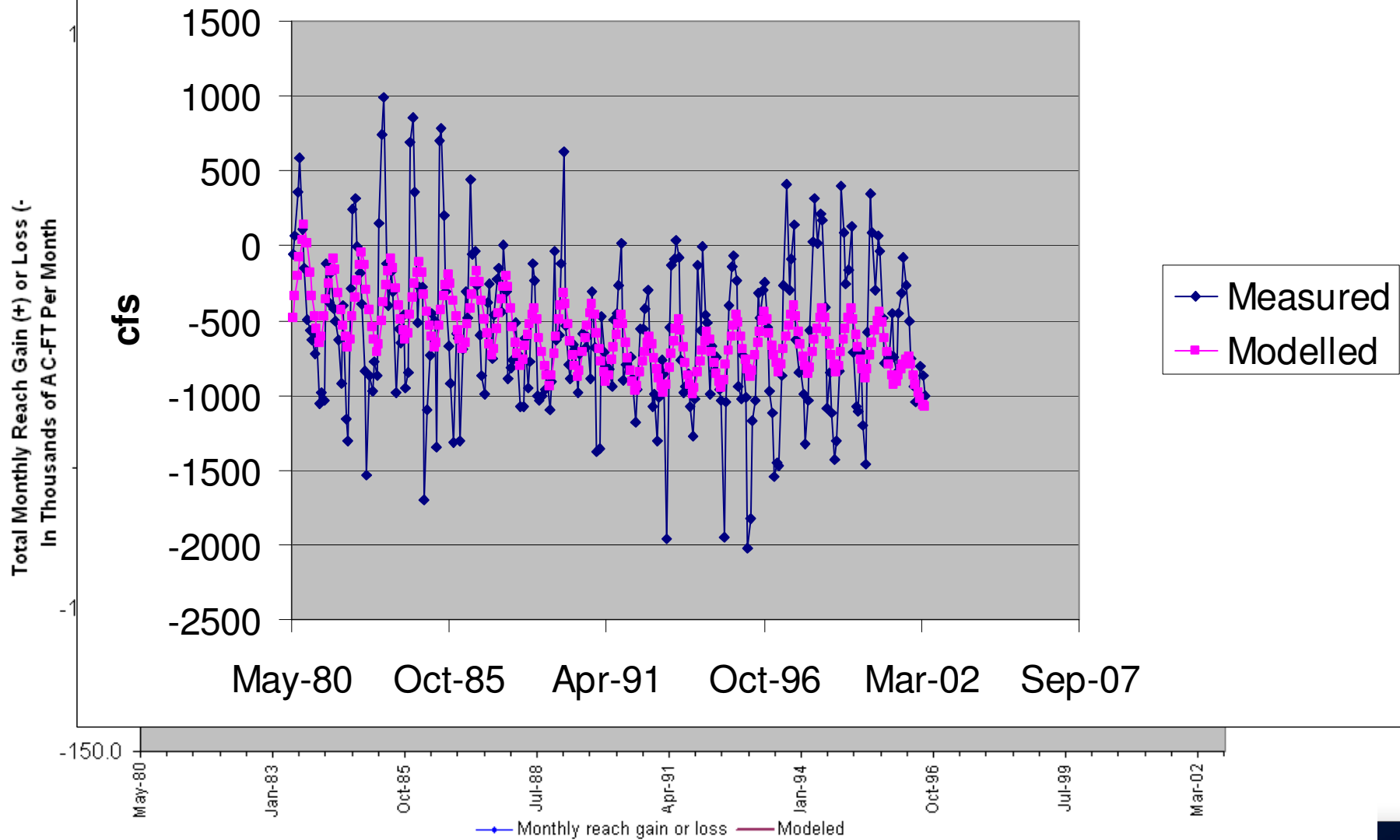
New Bound, Multi-drain 3 Solver fix



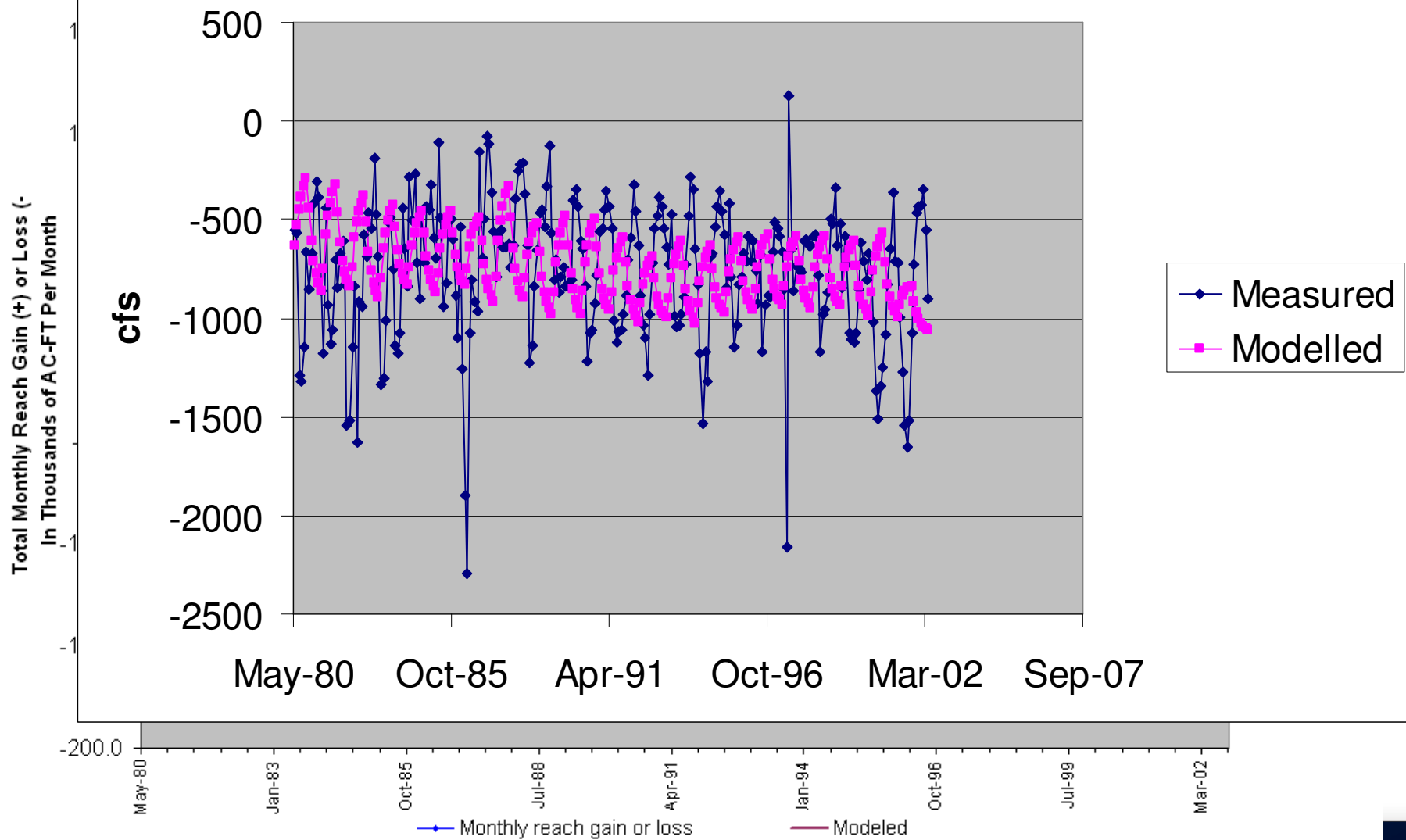
Ashton-Rexburg



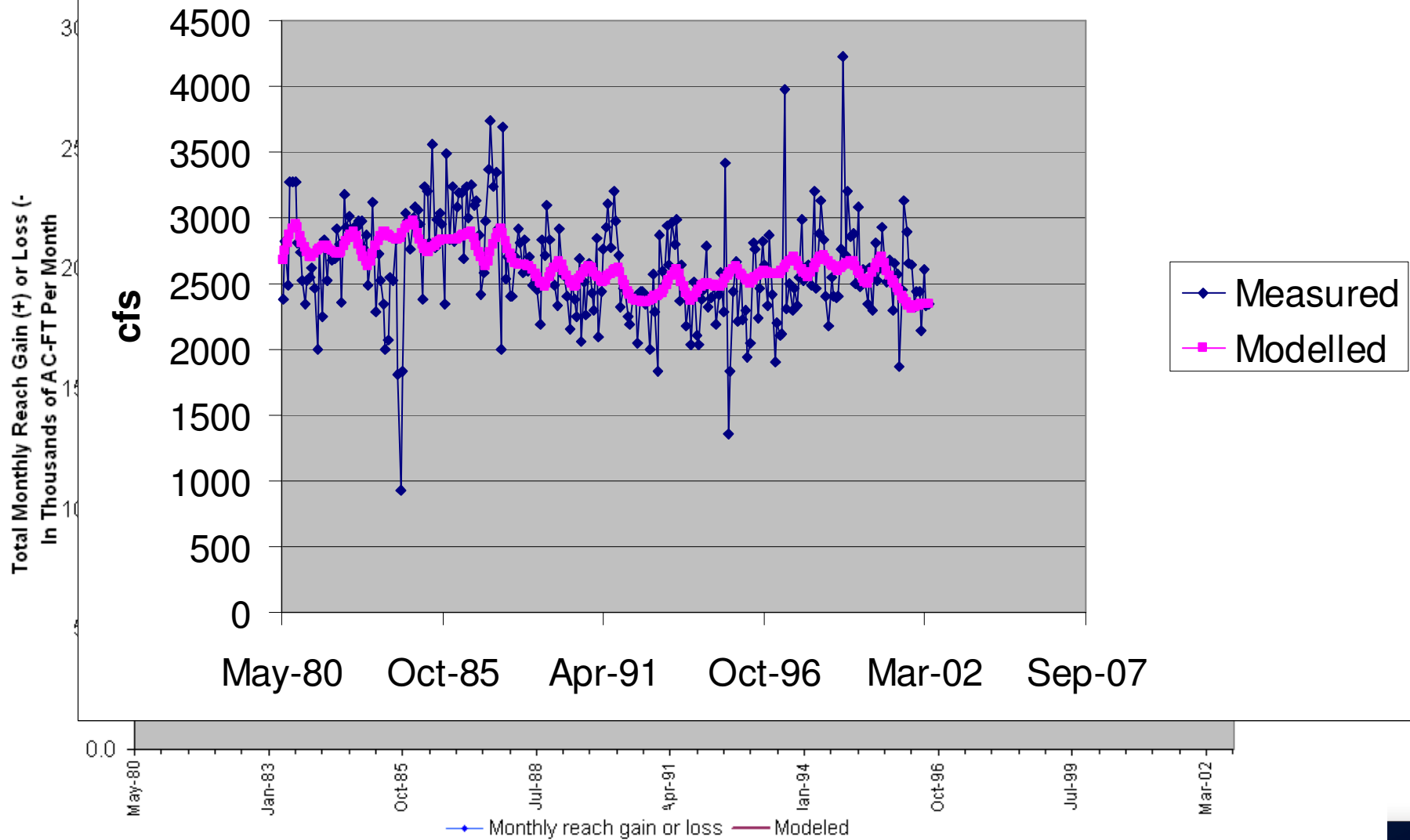
Heise-Shelley



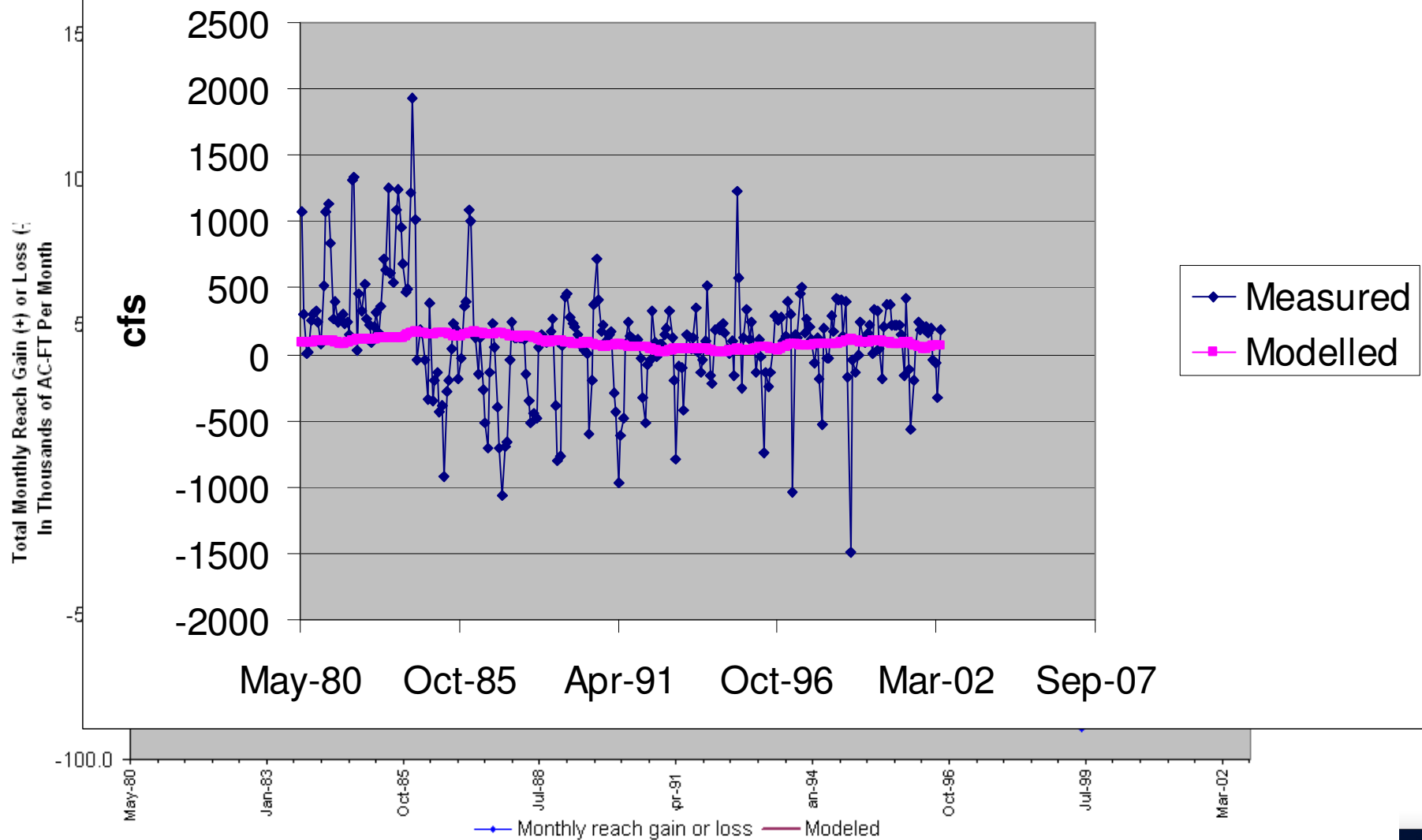
Shelley-nr Blackfoot



nr Blackfoot-Neeley

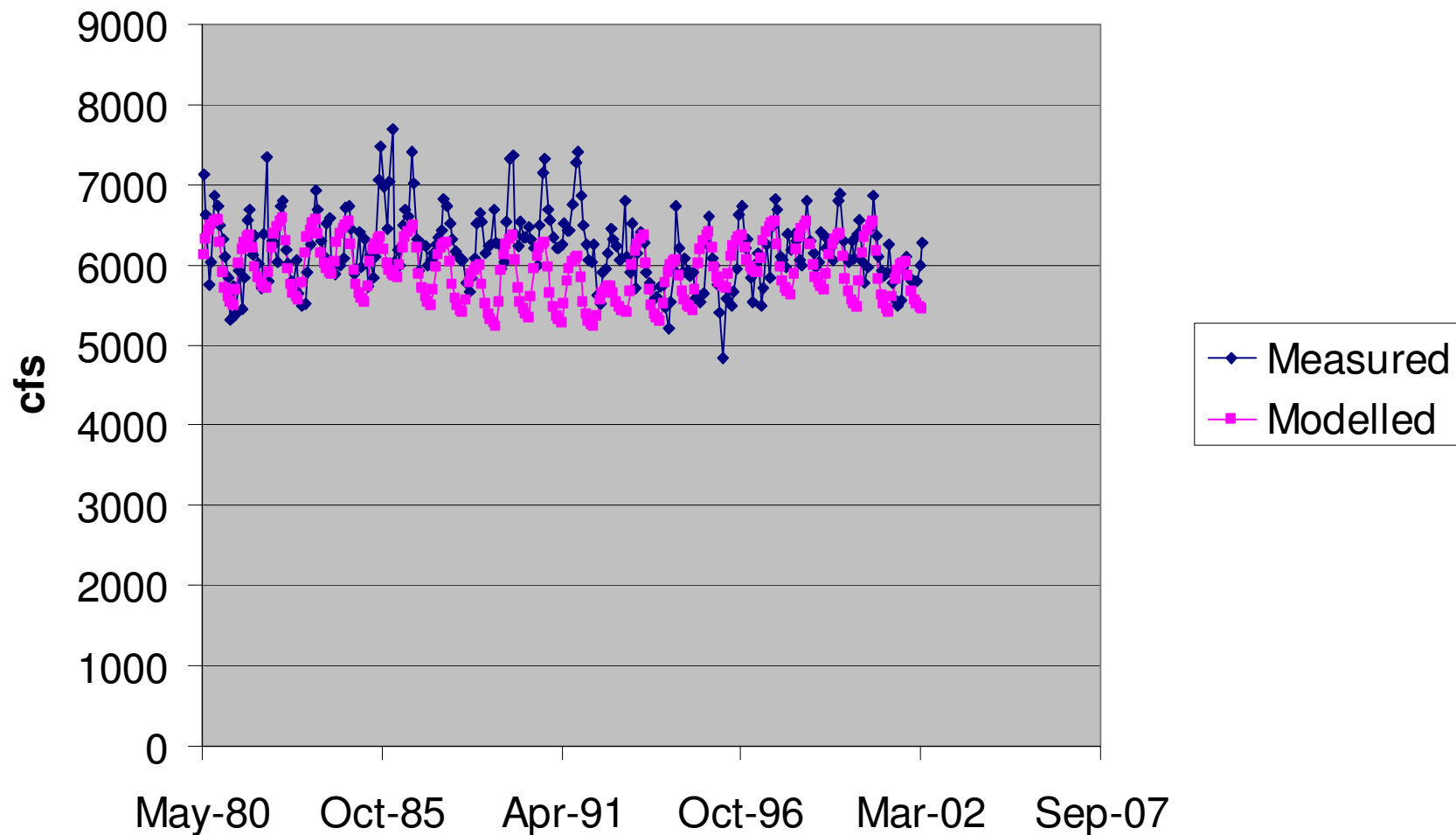


Neeley-Minidoka



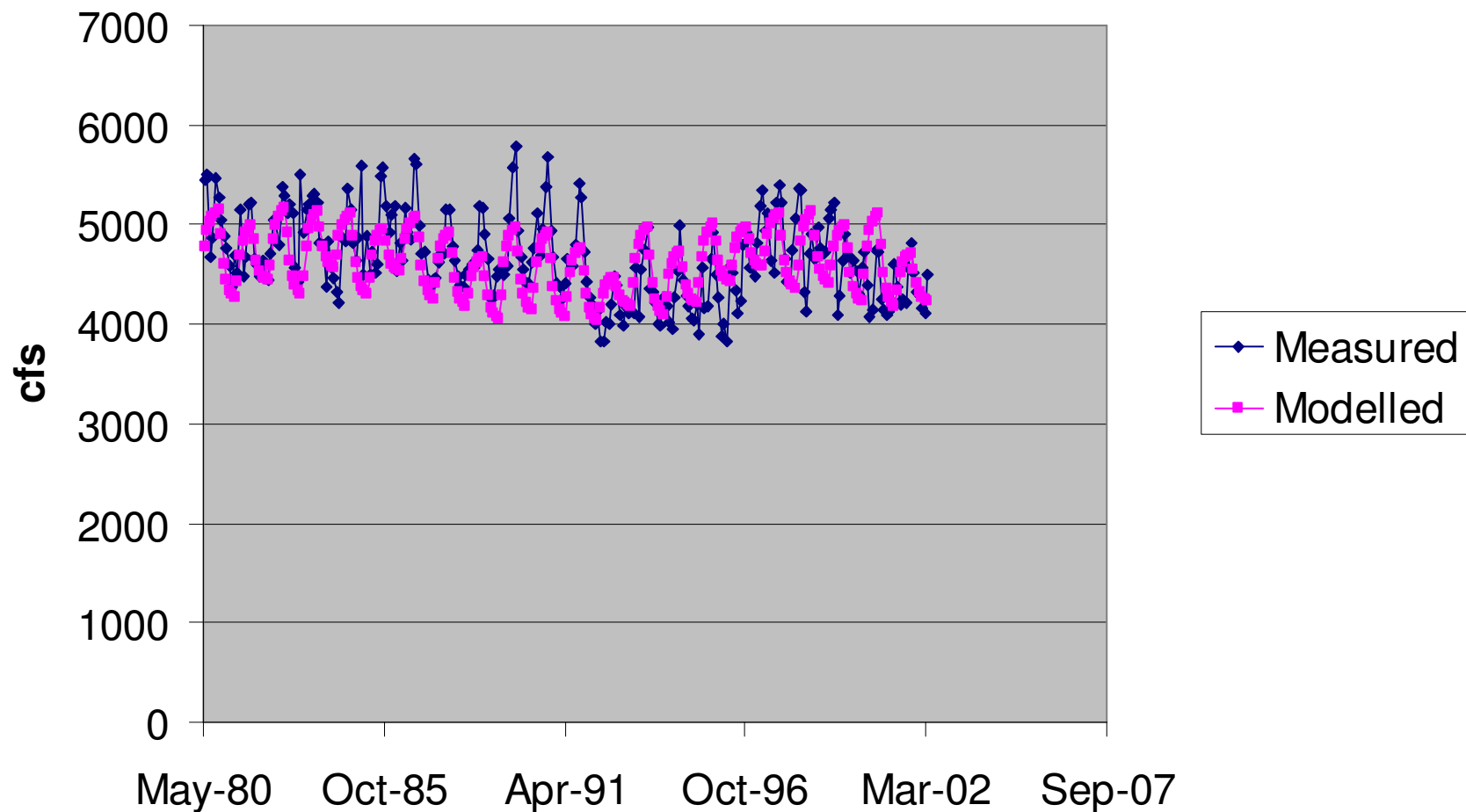
New Bound. Multi-drain 3. Solver fix

Kim_KH

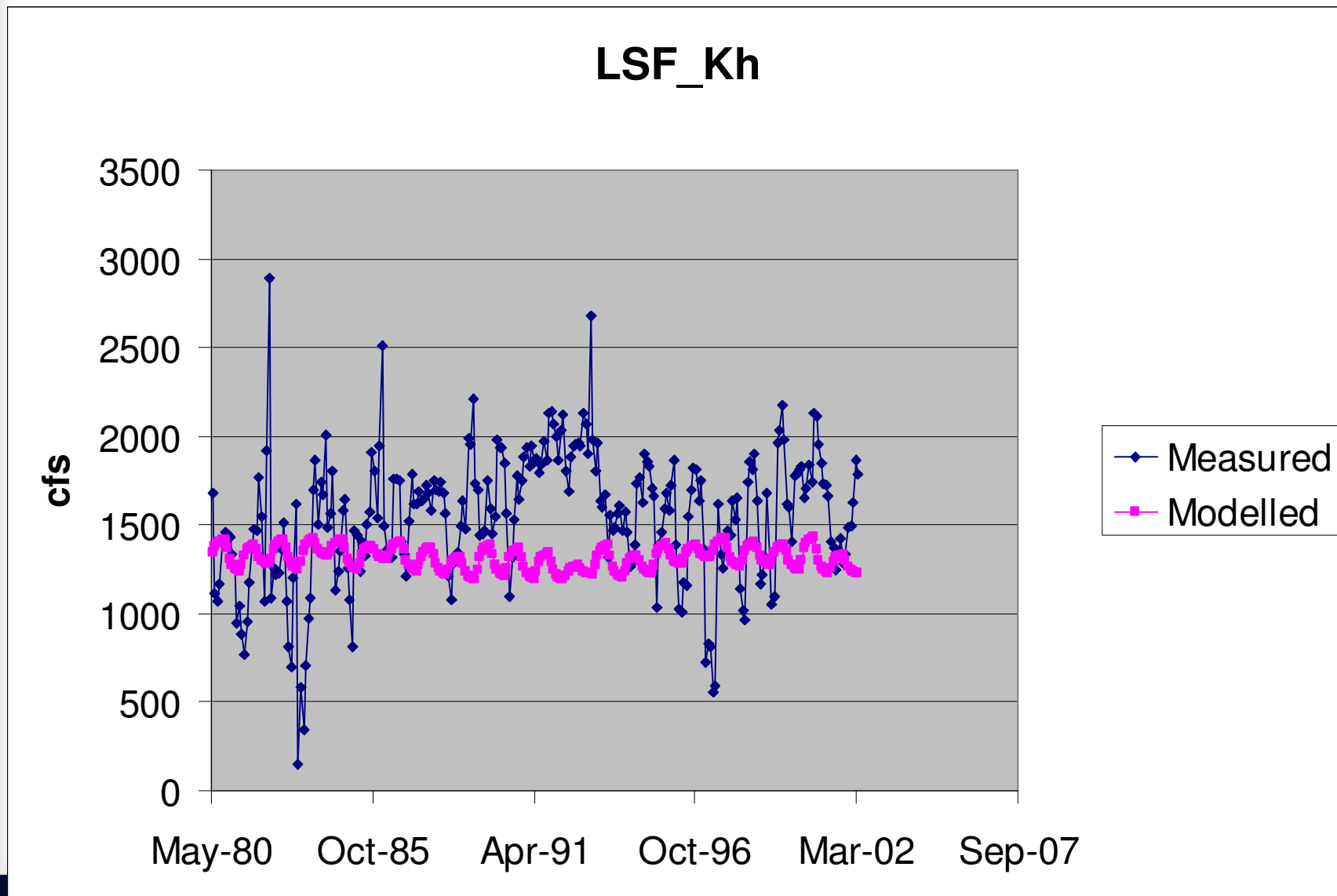


New Bound, Multi-drain 3, Solver fix

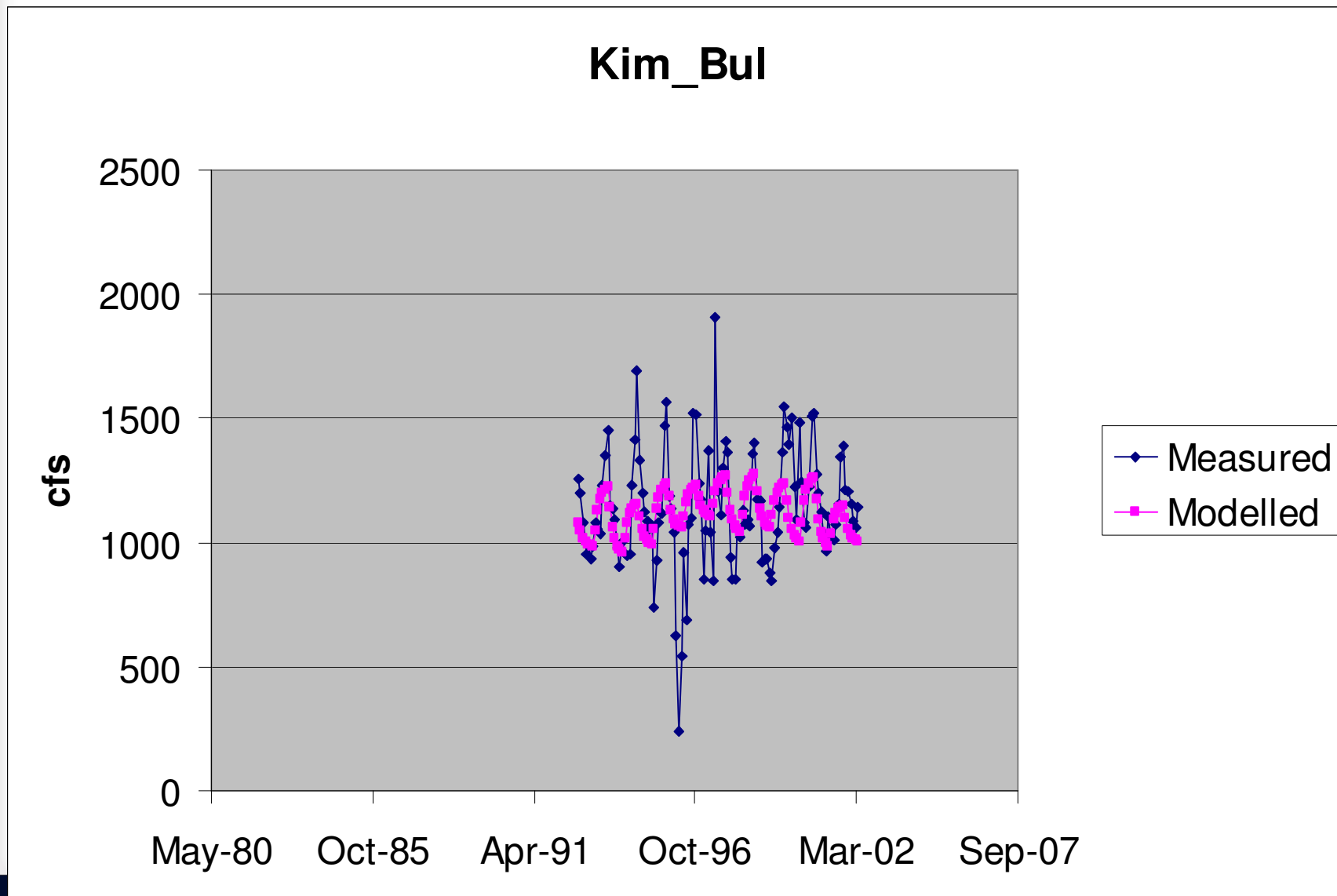
Kim_LSF



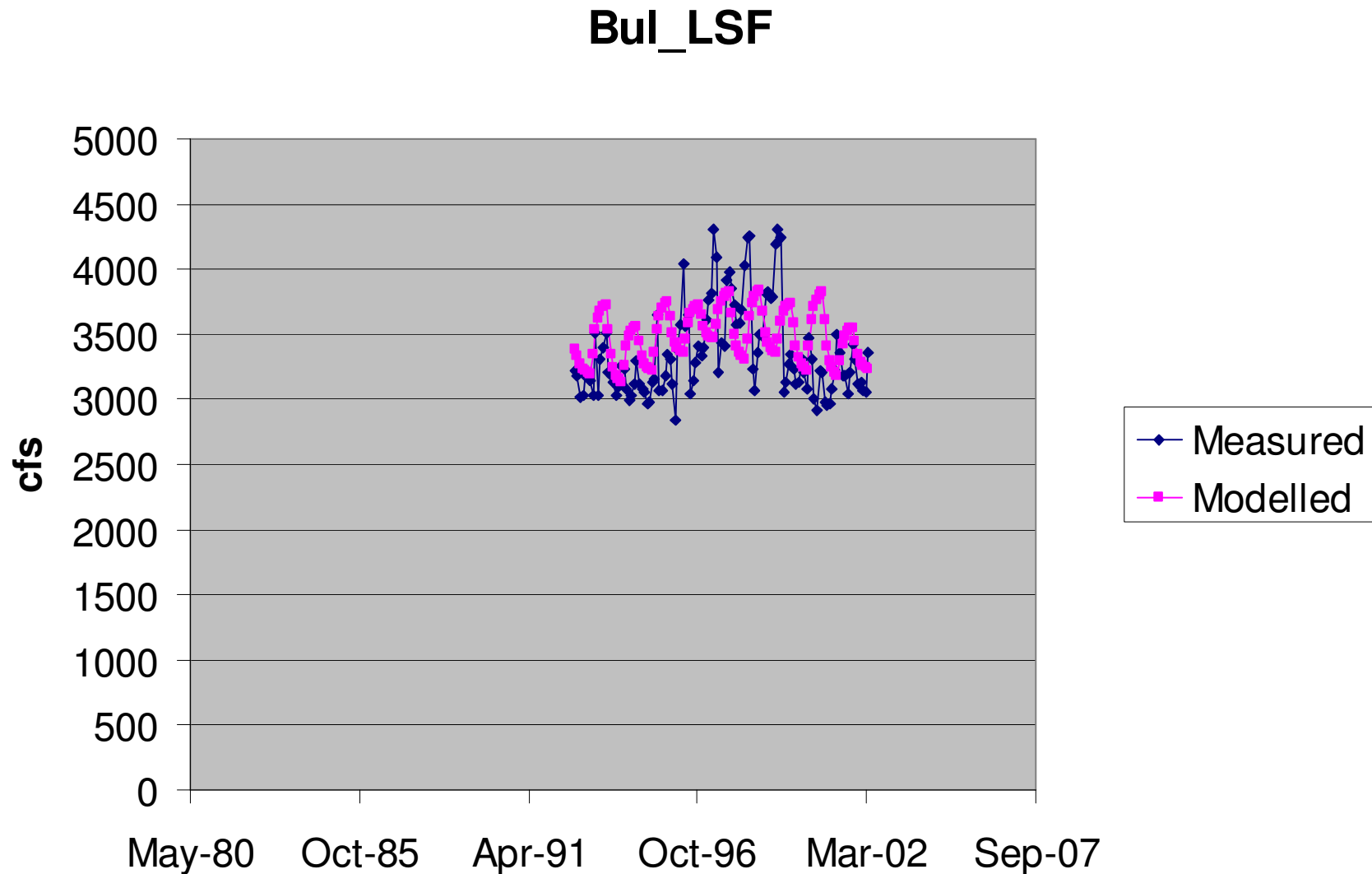
New Bound, Multi-drain 3, Solver fix



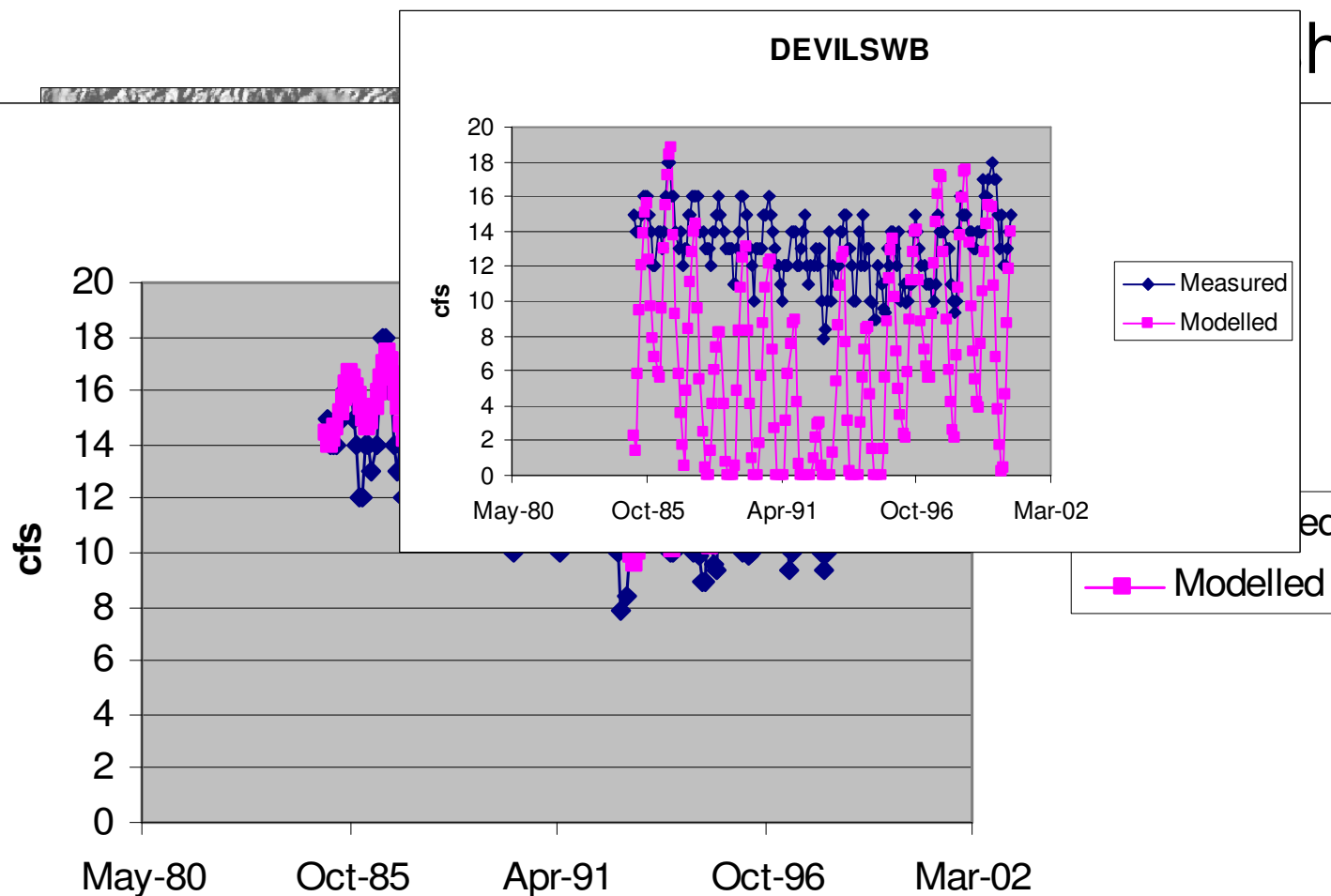
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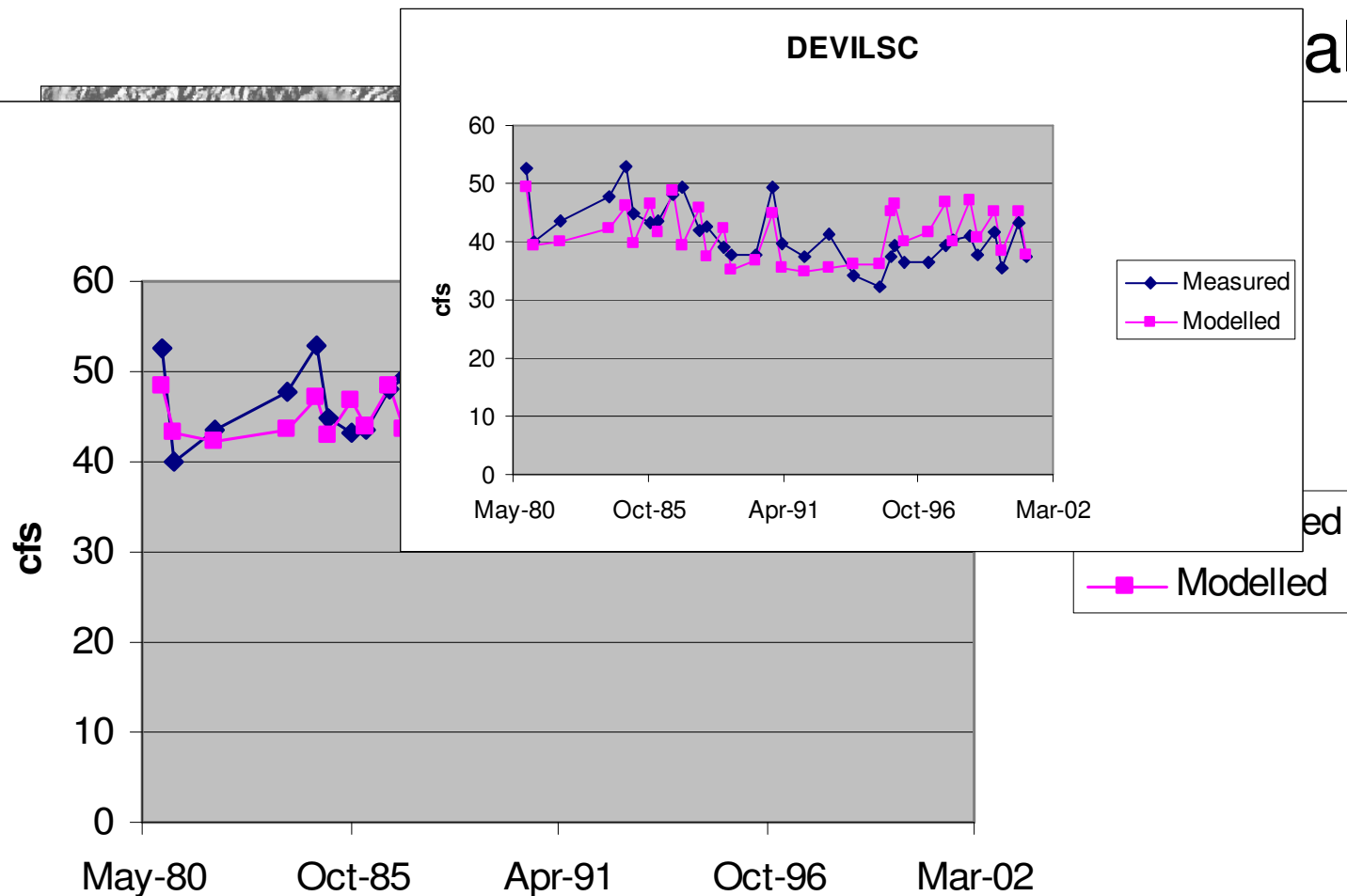


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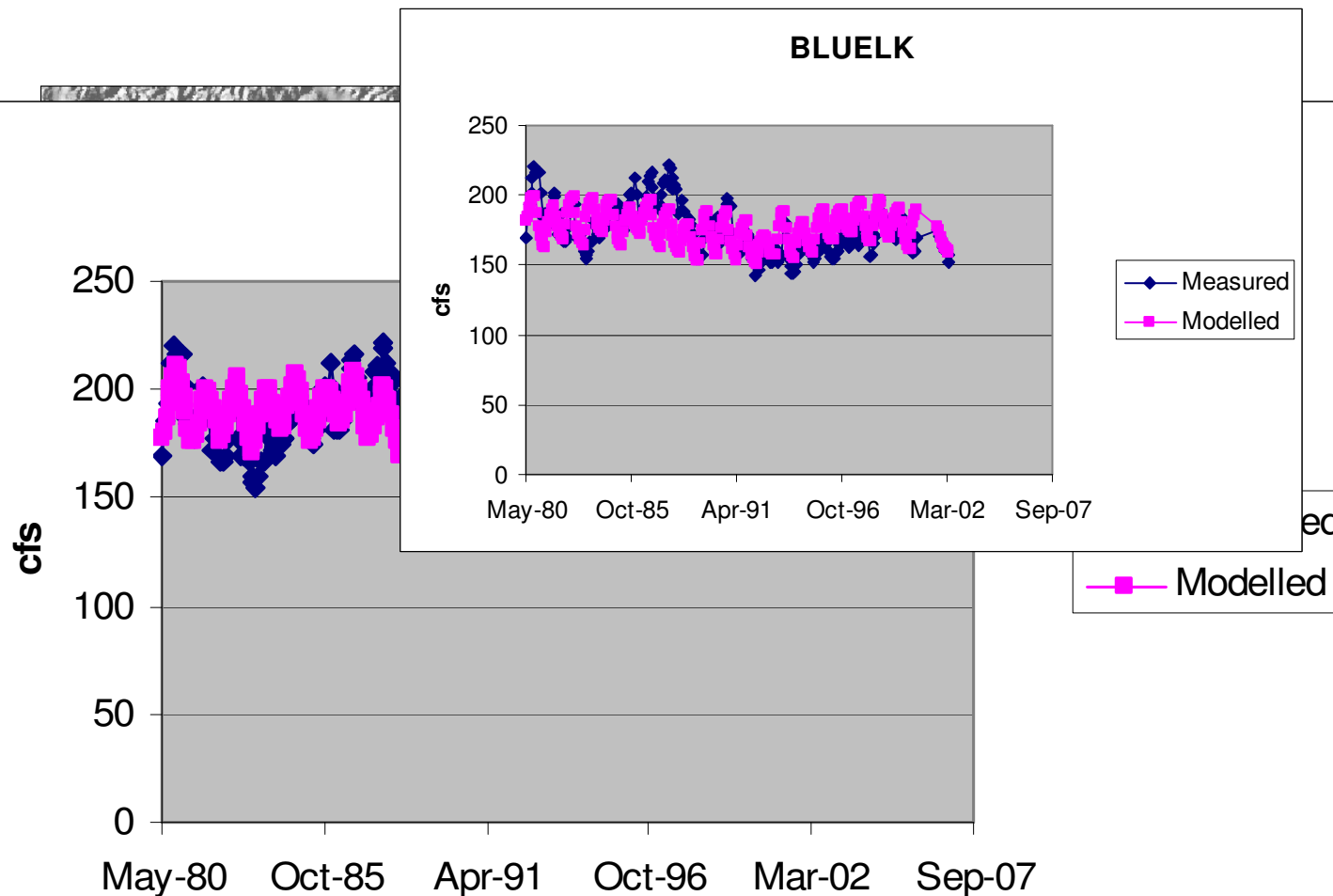
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Modelled

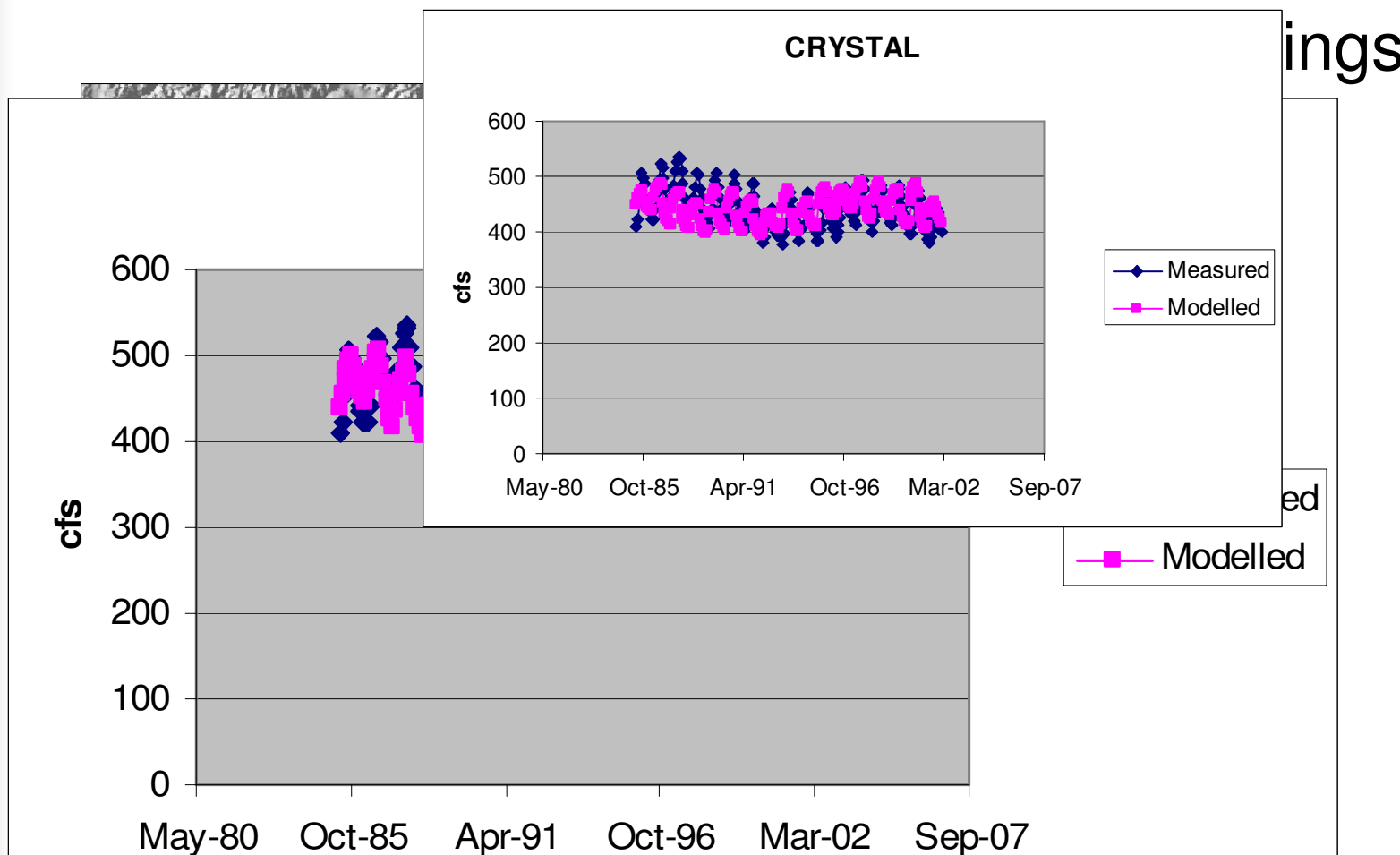
New Bound, Multi-drain 3, Solver fix



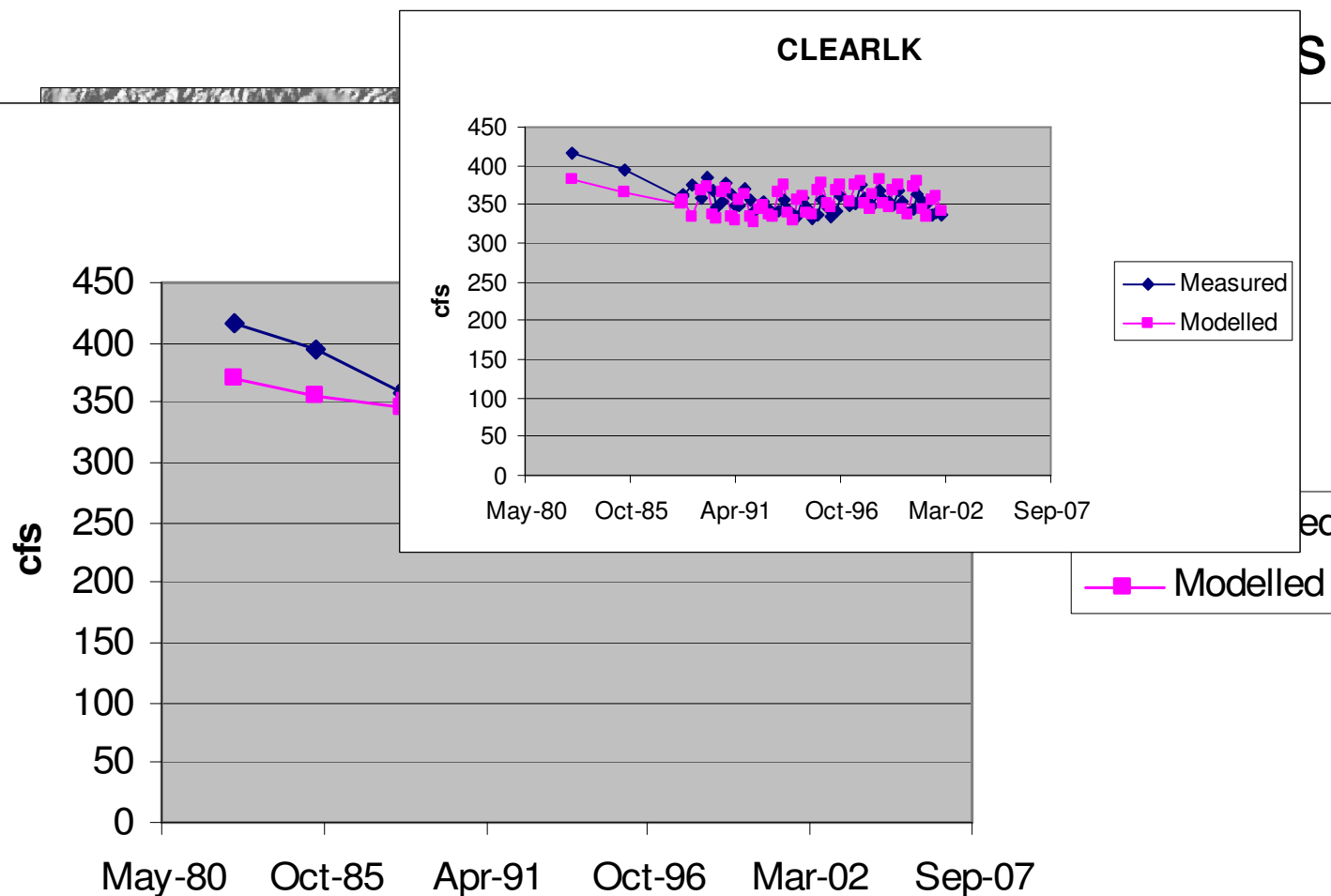
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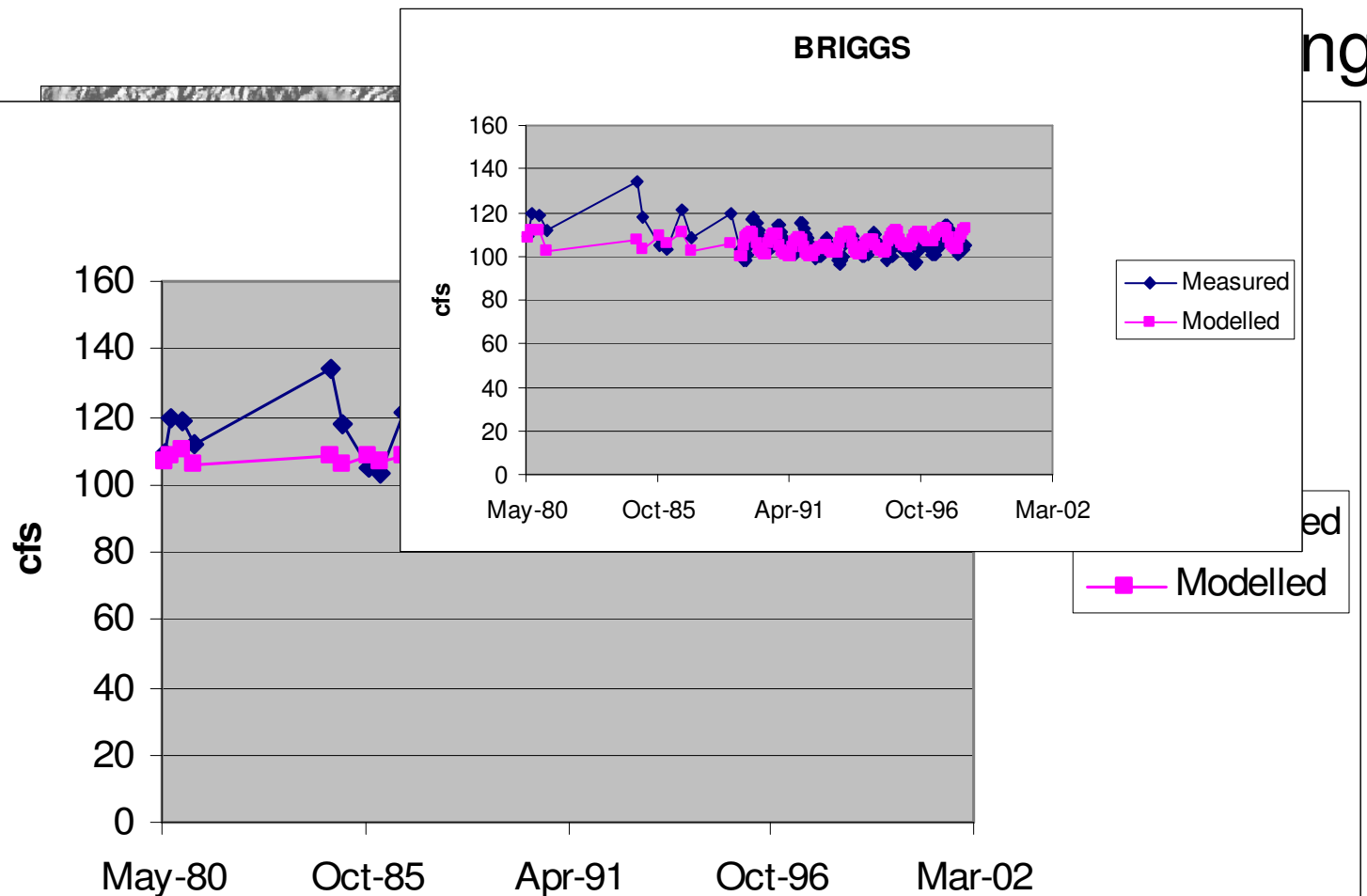
New Bound, Multi-drain 3, Solver fix



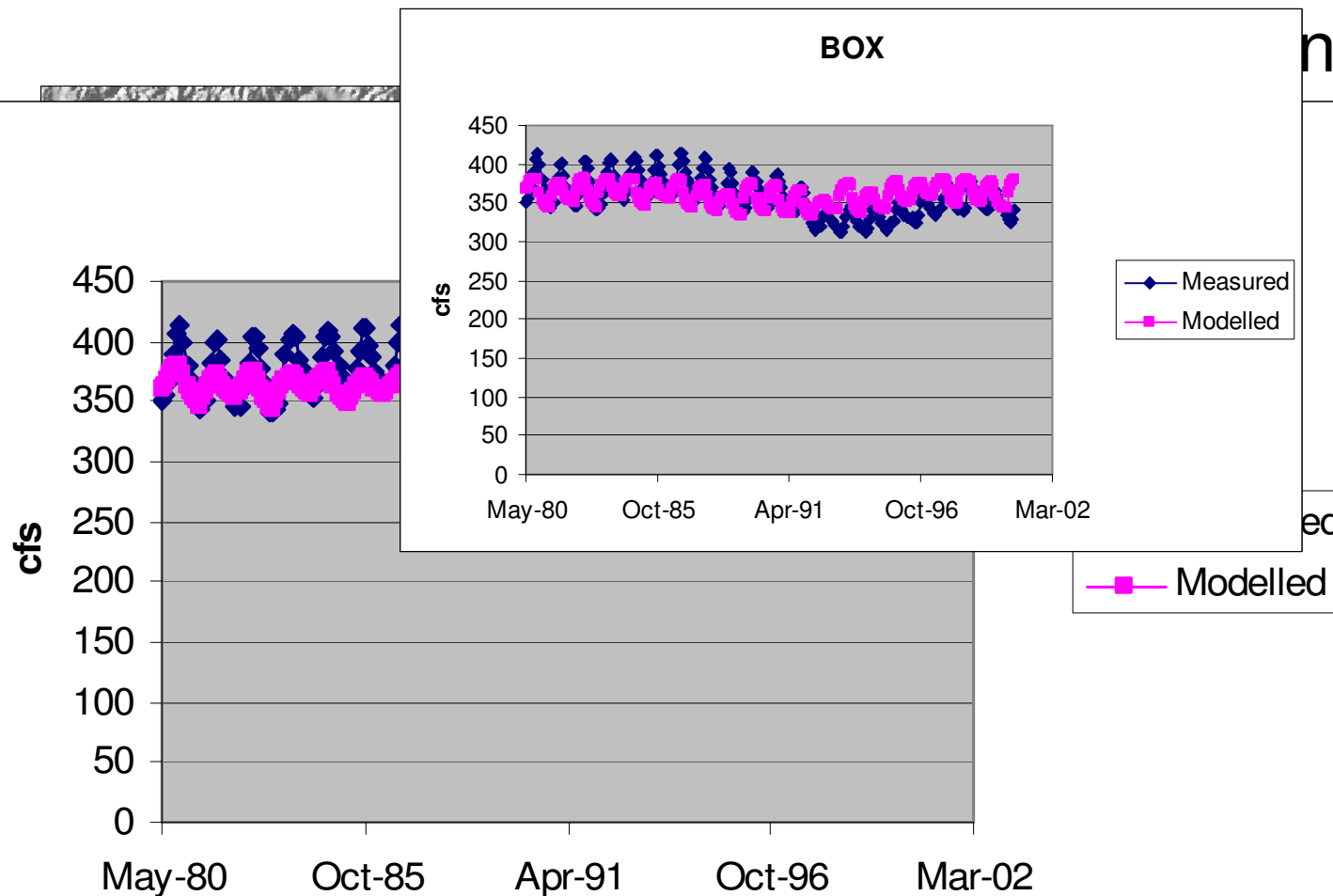
New Bound, Multi-drain 3, Solver fix



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New Bound, Multi-drain 3, Solver fix



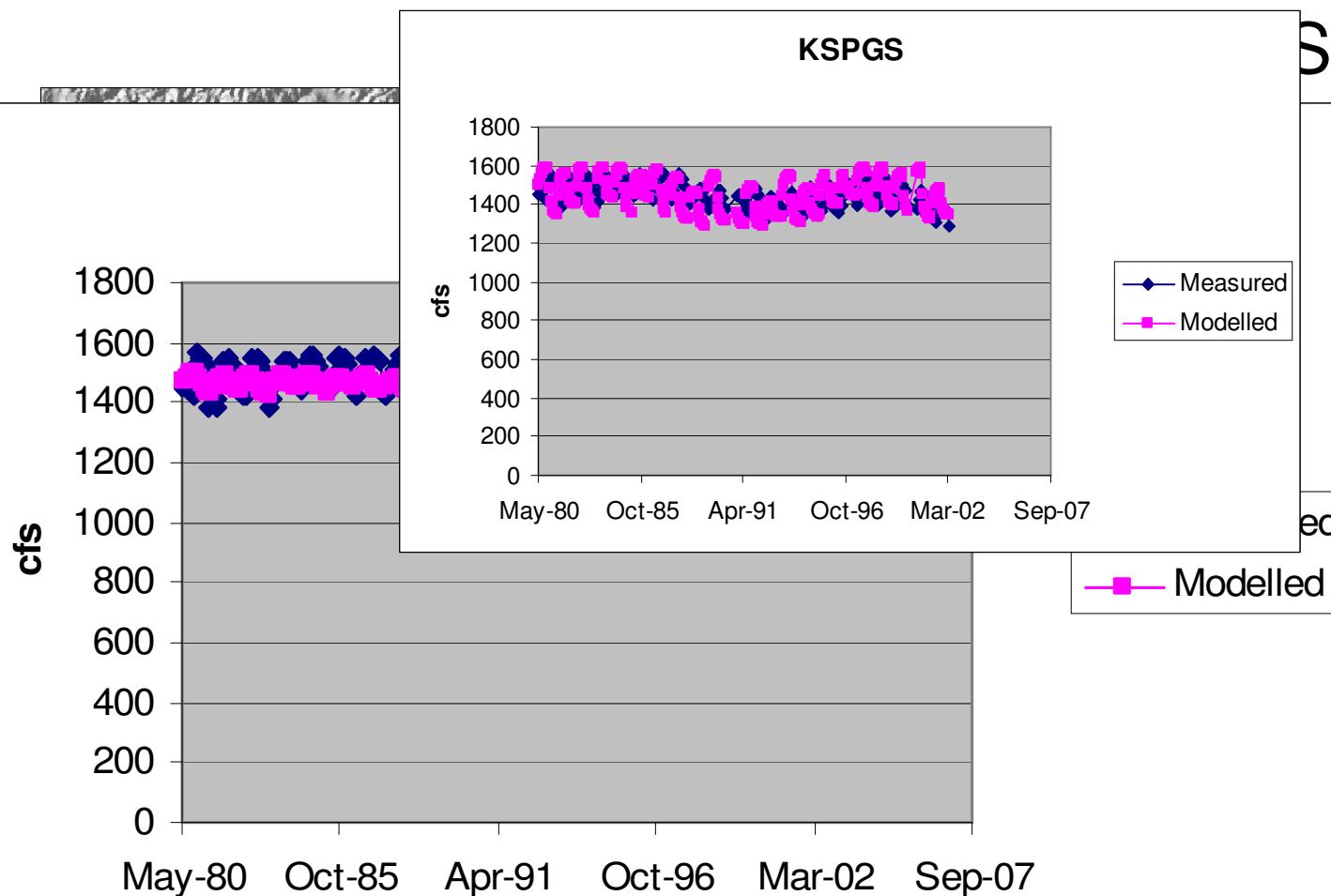
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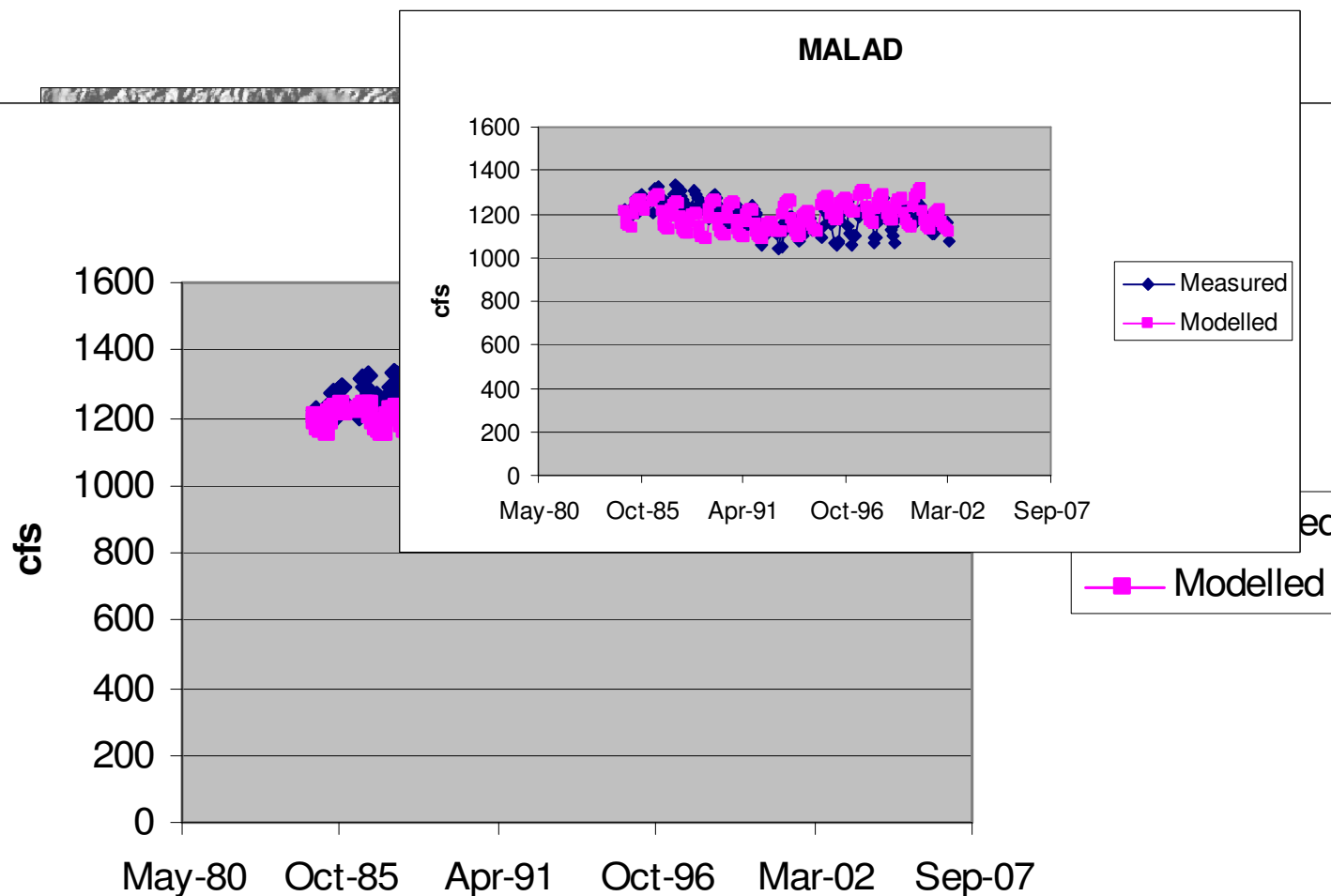
Modelled

New Bound, Multi-drain 3, Solver fix

Springs



New Bound, Multi-drain 3, Solver fix





Suggestions?

END

